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April 4, 2007

Ms. Laura Ripley
Early Action Project Manager
SE-4J
U.S. EPA Region V
77 West Jackson Blvd.
Chicago, Illinois 60604-3590

Re: Bucyrus City Dump
NFRAP
Crawford County, Ohio
CERCLIS #: OHN000509113

Dear Ms. Ripley:

The Ohio EPA Division of Emergency and Remedial Response completed sampling as part of the Bucyrus City Dump Expanded Site Investigation (ESI) on July 11, 2006. This ESI sampling event was conducted to determine if hazardous substances from previous waste disposal activities at the Bucyrus City Dump (site) are migrating off-site, and if so, whether these substances pose a potential threat to human health and the environment. Data were collected to further characterize the waste on-site by sampling waste materials not previously sampled as part of the 2004 PA/SI sampling event.

Sample locations and analytical results from the ESI sampling event can be found in the report in Appendix C: Complete Analytical Results and Figure 3: Sample Location Map. All site data from both investigations were entered into the U.S. EPA Hazard Ranking System (HRS) and scored below 28.5. Therefore it has been determined that this site should not remain in CERCLIS.

Based on the information presented above and in the attachments, a No Further Remedial Action Planned (NFRAP) determination is being made so that CERCLIS can clearly reflect sites that need to be addressed by Superfund.

If you have any questions or need additional information, Please contact me at 614-836-8756.

Sincerely,

Diane L. Crosby

Diane L. Crosby
Site Coordinator
Division of Emergency and Remedial Response

cc: Tiffani Kavalec
Mike Czeczele

OHIO ENVIRONMENTAL PROTECTION AGENCY (OHIO EPA)

DIVISION OF EMERGENCY & REMEDIAL RESPONSE (DERR)

EXPANDED SITE INVESTIGATION REPORT

BUCYRUS CITY DUMP
Crawford County
DERR ID: 317-2145
U.S. EPA ID: OHN000509113

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OHIO ENVIRONMENTAL PROTECTION AGENCY (OHIO EPA) DIVISION OF EMERGENCY & REMEDIAL RESPONSE (DERR) EXPANDED SITE INVESTIGATION REPORT			
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Approved by:	Erica Islas	Date:	3/30/07
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OHIO ENVIRONMENTAL PROTECTION AGENCY (OHIO EPA)

DIVISION OF EMERGENCY & REMEDIAL RESPONSE (DERR)

EXPANDED SITE INVESTIGATION REPORT

BUCYRUS CITY DUMP
Crawford County
DERR ID: 317-2145
U.S. EPA ID: OHN000509113

EXECUTIVE SUMMARY

Ohio Environmental Protection Agency (Ohio EPA) personnel conducted an Expanded Site Investigation (ESI) at the former Bucyrus City Dump (site) in Bucyrus Ohio, Crawford County on July 11, 2006 (Figure 1). The purpose of this ESI was to determine if hazardous substances from previous waste disposal activities at the site are migrating off-site, and if so, whether these substances pose a potential threat to human health and the environment. Data collected will be used to determine whether or not the site is of NPL caliber by documenting observed releases, observed contamination and potential targets.

Work conducted during the ESI included the collection of twenty-six (26) soil, sediment and surface water samples. This total includes background and duplicate samples.

1.0. INTRODUCTION

The Ohio EPA, Division of Emergency and Remedial Response (DERR) formed a cooperative agreement with the United States Environmental Protection Agency (U.S. EPA) Region 5 to conduct an ESI of the former Bucyrus City Dump, EPA ID# OHN000509113 (Latitude 40° 48' 00.0", Longitude 82° 59' 38.0").

2.0. BACKGROUND

Site Name: Bucyrus City Dump

Alias: N/A

DERR I.D. No.: 317-2145

U.S. EPA I.D. No.: OHN000509113

District: Northwest

County: Crawford

Site Address: 500 W. Southern Ave., Bucyrus, Ohio

Directions to Site:

From the Ohio EPA Field Facility, turn left onto Homer-Ohio Lane and then turn right onto Hamilton Road. Merge onto US-33, via the ramp-on the left-toward I-270. Merge onto I-270 North toward Wheeling. Merge onto US-23 North toward Delaware. Take the OH-4 ramp toward Bucyrus. Turn right onto Marion Bucyrus RD/OH-4. Continue to follow OH-4. Turn left onto Krauter Road. Turn right at the light onto Wyandot RD/CR-12. Turn right at the light onto W. Southern Ave. Turn left into the City of Bucyrus Waste Water Treatment Plant (WWTP). The Site is next to the WWTP along the Sandusky River.

Latitude: 40° 48' 00.0"N

Longitude: 82° 59' 38.0"W

2.1. Maps Attached

Figure 1: Site Location Map; Figure 1a: Site Location Map with Industries; Figure 2: Site Features Map; Figure 3: Sample Location Map; Figure 3a: Residential Well Sample Location Map (2004 PA/SI)

2.2. Site Description

The Bucyrus City Dump is located in Crawford County, Bucyrus Township at 1500 W. Southern Avenue within the corporation limits of the City of Bucyrus. The fill area is adjacent to both the south side of the Sandusky River and the east side of the Bucyrus WWTP (Figure 2). The segment of the Sandusky River which borders the north side of the site flows east to west. The topography of the site is relatively flat containing mostly open areas of grass, with the exception of a small patch of woods at the southwest corner of the fill area. The northern boundary of the site along the river bank is also wooded. The City of Bucyrus is currently operating a compost facility on the north-central portion of the site. The City of Bucyrus owns the property and they have owned it since prior to 1968.

The site is about 20 acres and fill material may extend to depths of 12 to 15 feet. These depths are based on historical information and on six GeoProbe™ test borings from the June 2, 2004 sampling event. The north slope of the dump extends along the river approximately 1,000 lineal feet and is relatively void of soil cover material. Approximately 300 feet of the river along the north slope of the site is being affected by erosion and washout. Within this 300 foot segment, waste materials and leachate have been observed entering into the river. A drainage ditch extends approximately 1,000 feet along the eastern limits of the dump. Several areas along the eastern drainage ditch contained exposed waste materials from rodents, erosion and washout. A large diameter combined sewer overflow/storm water pipe transects the dump from the south to north and discharges into the river downstream of the site.

This sewer has a manhole access located near the center of the fill area and just north of the access road that transects the site from east to west. There is another sewer outfall upstream of the active outfall that appears to be abandoned.

The nearest house to the limits of waste is approximately 440 feet south of the site and residential development is ongoing in the area to the south and west. Because there is no fence to restrict access, local residents including children are easily able to enter the site. The City constructed a foot bridge over the river at the northeast corner of the dump. This bridge provides access to the local park northeast of the site for citizens from neighborhoods to the south and west. Currently, citizens walk mainly on the asphalt access road for the site that leads to a small parking area just south of the foot bridge.

2.3. Regulatory Information

The Sandusky River is frequently impacted by combined sewer overflows (CSOs) in the City of Bucyrus study area (reference #1). The City is currently working on a long term control plan to address this issue. Separation projects are being implemented to reduce the amount and frequency of untreated discharges.

2.4. Site History

Little information is available regarding the site. The City of Bucyrus was not able to furnish any historical records regarding disposal operations, such as the depth of fill and/or the types of waste materials. According to Ohio EPA files, the site ceased accepting waste in 1969 when the Crawford County Landfill opened for business. Commercial, industrial, and residential waste materials were likely dumped adjacent to and within the flood plain of the river. Historical aerial photographs from the early 1960s show evidence of burning and trash piles east of the WWTP. Industrial wastes (rubber, drums, dried paint sludge) were observed along the east and north slopes of the dump and in the small wooded area in the southwest corner of the fill area. According to local residents, these wastes were likely generated from the GE Light Bulb Plant, Timken, Anchor Swan Company, and foundry operations. These companies were in business when the dump was in operation and are still in business today with the exception of foundry operations (see Figure 1a for locations relative to the dump).

2.5 Redevelopment Activities

Since sampling activities, the eastern perimeter ditch was relocated approximately 100 feet further east during the Fall of 2006 as part of sewerage improvements within the City (Figure 2). The existing ditch has been backfilled with re-compacted clay material to isolate the eastern portion of the dump from surface water bodies and to eliminate direct contact threats. Upstream or south of the dump site, this ditch was cleaned of excess sediment buildup during the City's storm water sewer improvements.

Soil was placed on the dump south of the access road that traverses the site to promote positive drainage, reduce leachate generation, and to eliminate direct contact threats. The City will be seeding this area and all disturbed areas in the Spring of 2007.

The City is planning to establish a walking path to the foot bridge that is east of the fill area near the newly relocated stream. This will further minimize direct contact threats and improve safety by keeping pedestrians away from vehicle traffic entering the WWTP and compost facility.

The City also plans to install sheet piling along the south river bank in 2007 where the leachate outbreaks and erosion are occurring. The sheet piling will stabilize the bank, prevent further waste materials from being washed into the river, and will eliminate ongoing leachate discharges.

Some excavation and filling has occurred on the northwest corner of the dump close to the bank of the Sandusky River since the 2004 PA/SI sampling event. Drums and other debris previously exposed are no longer visible and as a result, sampling of drum contents did not occur during the ESI sampling event. However, subsurface borings were focused in this general area to assess current site conditions.

2.6. Previous Field Work

A Preliminary Assessment/Site Investigation (PA/SI) was conducted at the site June 2, 2004 (soil and ground water samples collected) and June 22, 2004 (sediment and surface water samples were collected). Identified exposure pathways of concern are surface water and direct contact with soil. Refer to Appendix G for analytical results from the PA/SI sampling event.

2.7. Topography, Geology, Hydrogeology and Hydrology

The oldest rocks exposed in Crawford County are Devonian in age (about 345 to 395 million years ago). During this period, saltwater seas covered most of Ohio. Thick deposits of carbonate material accumulated in these seas setting the stage for the formation of the Columbus and Delaware limestone that outcrop in western Crawford County. In the late Devonian, the depositional environment changed as the seas deepened and became more
Stagnant. Carbon-rich sediments increased as the lime decreased. These thick deposits of sediments consolidated into the massive Olentangy and Ohio shale.

At the beginning of the Mississippian period, gray shale was still accumulating. However, as the land to the east of the county was uplifting, gray mud formed the Bedford shale and the sandy sediment, also referred to as the Berea sandstone. Following the deposition of the Berea sandstone, the inland seas again encroached, depositing mud which makes up the Sunbury shale. Another series of uplifts in the east is responsible for the increased deposition of sands making up the Cuyahoga formation which consists of alternating beds of sandstone and siltstone. Crawford County lies on the east flank of the Cincinnati Arch; therefore, the rocks strike north-south and dip eastward or slightly southeast.

The regional inclination or dip is 31 feet per mile. The Devonian age rocks outcrop in the western part of the county and the younger Mississippian formations are exposed along the eastern part of the county. A cross-section was constructed using boring information from the Ohio Geological Survey bulletins and the ODNR Water Division maps. The surficial sediments are a result of several glaciations where glaciers advance, scouring the bedrock and depositing the drift material as end moraines when advancement ceased. When the glacier advanced slowly, drifts forming the Wisconsin Ground moraine were evenly deposited.

The depth to bedrock in the Bucyrus area is between 35 and 70 feet below land surface (ftbls). The bedrock in this area is the basal portions of the Ohio shale. The Ohio shale of the Ohio Formation is late Devonian in age. The Ohio Formation consists of three members: Huron, Chagrin and Cleveland. The Huron and Cleveland units are typically black or brownish black fissile shale with a high content of carbonaceous matter and/or pyrite either in fine crystals, modules or flakes. The Chagrin, or middle unit, is gray siliceous shale and differs in the Huron and Cleveland because it lacks organic and pyretic matter.

The Ohio Formation is commonly quite massive and the thickness varies from less than 400 feet to 3,400 feet. The Bucyrus area is located very close to the contact between the basal portion of the Ohio Formation and the top of the Delaware Formation which consists of generally evenly bedded fossil ferrous limestone with the shale partings (inter-bedded shale). The Delaware limestone and Ohio shale contact dips generally to the east and is approximately 165 ft-bls in the Bucyrus area. The Ohio shale is believed to act as an aquitard. It has a very low hydraulic conductivity and is thought to yield little or no groundwater (ODNR).

The surficial sediments are a result of several glaciations where glaciers advanced and retreated, scouring the bedrock and depositing geologic materials in a range of particle sizes as end moraines when advancement ceased. The term end moraine refers to a linear zone of slightly higher topography, which in Ohio is oriented in a series of east-west trending belts, representing places where the glaciers paused or retreated. Because end moraine was deposited at the margin of a melting ice sheet, the sedimentary materials ranging in size from clay, silt, sand, gravel, cobbles, and even large boulders were sorted to some degree by the action of flowing surface water. Sorted sand and gravel deposits are often found in end moraines, enclosed within a more clay rich matrix. Ground moraine, in contrast, consists of unsorted geologic materials transported by the ice.

The use of shallow groundwater in Crawford County for domestic purposes is limited based on either poor pumping rates due to low hydraulic conductivities in the sediments or undesirable amounts of hydrogen sulfide in the bedrock. To the west of Bucyrus, at depths of less than 300 feet, test wells have been developed that produce between 100 and 500 gallons of water per minute. Farm and domestic wells have been developed producing 10 to 15 gallons per minute at depths less than 95 ft-bls. In the Bucyrus area, like much of central Crawford County, groundwater use is restricted to the shallow glacial till sediments which generally produce less than three gallons per minute (ODNR Water Division map). There are approximately 8 residential wells less than ½ mile from the site (ODNR Well Logs).

Dry wells are not uncommon and home owners rely upon additional storage and/or cisterns to maintain daily requirements of water. Although shallow wells less than 40 ft-bls often yield fresh and hydrogen sulfide-free water, deeper drilling will yield sulfurous water. The Bucyrus area relies on surface water for most commercial and domestic uses. The surface water intake is located upstream of the site on the Sandusky River.

By 1904, water was taken directly from the Sandusky River and forced through mechanical filters into the water mains. Dams were built to impound water for summer use. By 1941, other reservoirs had been built in the area and water was treated with alum for coagulation and chlorine for disinfection. In 1983, a public water supply was established.

The Bucyrus area is known to have a seasonally high perched water table which at times is less than 1 ft-bls. This high water table and the relatively low hydraulic conductivity of the soils and sediments cause surface ponding of rainwater after storms. Shallow groundwater south of Bucyrus is believed to flow from east to west toward the Little Scioto River.

2.8. Land Use and Demographic Information

See Site Description

3.0. METHODOLOGY

Soil, sediment and surface water were collected during the ESI sampling event. Samples were analyzed by U.S. EPA Contract Laboratory Program (CLP) laboratories. Analyses included the following parameters: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/PCBs, Target Analyte List (TAL) metals and Cyanide. Mercury was not analyzed during the ESI sampling event. The compound was inadvertently left off the Analytical Confirmation Request. Complete analytical results of this investigation are contained in Appendix A.

Significant detections are located in Tables 1-3. Under the Hazard Ranking system (HRS), results are considered significant if the concentrations are three times the background concentrations and above the Contract Required Detection Limit (CRDL) or Contract Required Quantitation Limit (CRQL). The data were reviewed by U.S. EPA Region V personnel for compliance with the Contract Laboratory Program (CLP), and electronically validated by using the U.S. EPA Computer-Aided Data Review and Evaluation (CADRE) software program.

Several SVOC's (mostly PAHs), were found to be slightly elevated in both background samples compared to the background sample collected during the 2004 PA/SI. These elevated concentrations may be impacts from previous site operations or from other anthropogenic activities. Because the data may not be truly representative of background surface soil conditions, the background SVOC surface soil concentrations from the 2004 PA/SI were also used for comparison purposes when developing the significant hits tables.

Previously observed wastes in rusted out 55 gallon drums located along the river in the northwest corner of the site were not sampled as part of this investigation. This was due to excavation/filling activities which likely covered the drums and made them inaccessible for sampling (Figure 3). Subsurface sampling during the ESI was conducted as near as possible to the former location of the previously observed drums.

A photographic log of Bucyrus City Dump can be found in Appendix D.

3.1. Field Screening and Sampling Locations

SOIL: A total of ten (10) soil samples (surface and sub-surface) were collected, including background and duplicate samples. Subsurface samples were collected using direct push technologies (i.e., Geoprobe ™), soil cores were collected at 8 of the 10 on-site locations. The remaining 2 on-site soil samples were the background samples and were collected from 0 - 10" using shovels and spoons. Soil samples were collected to determine the potential for direct exposure of contaminants to the public and to determine the potential for migration of the contaminants to the Sandusky River and for the migration of contaminants from the soil into ground water. Soil sample locations were chosen based on historical records, previous sampling events, and current physical appearance of the dump (Figure 3).

SEDIMENT: A total of eight (8) sediment samples were collected, including background and duplicate samples. Samples were collected using shovels, spoons, and core tubes. Sediment samples were collected to determine potential impacts to ecological receptors as well as human health impacts to recreational users. Sediment sample locations were chosen based on historical records, previous sampling events, and areas of sediment accumulation. Two (2) background samples were collected in the river upstream of the site and two (2) background samples were collected in the ditch upstream of the site.

SURFACE WATER: A total of eight (8) surface water samples were collected including background and duplicate samples. Surface water samples were collected in the Sandusky River which borders the northern boundary of the site and in a ditch that borders the site to the east (Figure 3). Two (2) background samples were collected in the river upstream of the site and two (2) background samples were collected in the ditch upstream of the site. Surface water samples were collected in the same relative locations as sediment samples.

GROUND WATER: Ground water samples were not collected during the ESI.

AIR: Air samples were not collected during the ESI.

3.2. Field Screening and Sampling Methodologies

Standard quality assurance and quality control (QA/QC) procedures for PA/SI field activities were followed during the investigation. Procedures for sample collection, packaging and shipping, and equipment decontamination, are documented in the Quality Assurance Project Plan (QAPP), for Region V Superfund SI activities for Ohio EPA, and the Ohio EPA Field Standard Operating Procedures (Reference 6).

4.0. RESULTS

SOIL: Soil samples SO-01 through SO-08 were collected with Ohio EPA's GeoProbe along the northern edge of the site in the vicinity of previously observed drums. Shallow and deep samples were collected at four soil boring locations (Figure 3). The following is a discussion of soil sample locations and results. Refer to Tables 1-3 for significant detections.

The VOCs Acetone and 2-butanone were detected at low levels above the CRQL in samples SO-04 (E1553), SO-05 (E1554), SO-06 (E1555) and SO-08 (E1557). These two compounds are common lab contaminants. No significant PCBs were detected in any of the soil samples.

Sample SO-01 (E1550/ME1550) was collected 18' below ground surface (bgs) in soil boring 1. Significant TAL Metals detected include: Calcium at 81,200 mg/kg and Magnesium at 29,500 mg/kg. No significant SVOCs were detected. The pesticide 4,4'-DDD was detected at 4.3 ug/kg.

Sample SO-02 (E1551/ME1551) was collected 4' bgs in soil boring 1. Significant TAL Metals detected include: Calcium at 36,700 mg/kg and Magnesium at 10,100 mg/kg. The SVOCs Pyrene and Benzo(b)fluoranthene were detected just above the CRQL at 440 ug/kg and 360 ug/kg respectively. The pesticide Endrin was detected at 4.1 ug/kg.

Sample SO-03 (E1552/ME1552) was collected at 2-4' bgs in soil boring 2. Significant TAL Metals detected include: Calcium at 39,200 mg/kg, Lead at 313 mg/kg and Magnesium at 9410 mg/kg. No significant SVOCs or Pesticides were detected.

Sample SO-04 (E1553/ME1553) was collected 15-20' bgs in soil boring 2. The Pesticide 4,4'-DDD was detected at 4.4 ug/kg. No significant Metals, SVOCs or Pesticides were detected.

Sample SO-05 (E1554/ME1554) was collected 2-6' bgs in soil boring 3. Significant TAL Metals detected include: Antimony at 57.3 mg/kg, Barium at 609 mg/kg, Cadmium at 18.2 mg/kg, Calcium at 37,600 mg/kg, Chromium at 66.5 mg/kg, Copper at 933 mg/kg, Iron at 99,400 mg/kg, Lead at 1370 mg/kg, Nickel at 378 mg/kg, Zinc at 2770 mg/kg and Cyanide at 2.4 mg/kg. The SVOC Pyrene was detected just above the CRQL at 400 ug/kg. Significant Pesticides detected include: Heptachlor at 20 ug/kg, Heptachlor

Epoxide at 9.8 ug/kg, Endrin at 11 ug/kg, 4,4'-DDD at 30 ug/kg and 4,4'-DDT at 100 ug/kg.

SO-06 (E1555/ME1555) was collected 19-20' bgs in soil boring 3. There were no significant metals or compounds of concern detected in this sample other than the pesticide 4,4'-DDD at 4.8 ug/kg.

SO-07 (E1556/ME1556) was collected 2-4' bgs in soil boring 4. TAL Metals detected include: Antimony at 16 mg/kg, Barium at 431 mg/kg, Cadmium at 6.6 mg/kg, Copper at 239 mg/kg, Iron at 69,600 mg/kg, Lead at 683 mg/kg, Zinc at 2080 mg/kg, and Cyanide at 2.2 mg/kg. Significant SVOC's detected include: Butyl-benzyl-phthalate at 1300 ug/kg and Bis(2-ethylhexyl)phthalate at 1600 ug/kg. Significant Pesticides detected include: Heptachlor at 6.1 ug/kg, Heptachlor Epoxide at 4.1 ug/kg, Dieldrin at 22 ug/kg, 4,4'-DDE at 12 ug/kg, 4,4'-DDD at 9.2 ug/kg, 4,4'-DDT at 34 ug/kg, and alpha-Chlordane at 7.9 ug/kg.

Sample SO-08 (E1557/ME1557) was collected 8-10' bgs in soil boring 4. No significant metals or compounds of concern were detected.

Samples SO-09 and SO-10 (E1558/ME1558 and E1559/ME1559) were collected 0-6" bgs with a shovel and spoon. These samples were collected to determine representative background concentrations in surface soils. Please refer to Figure 3 for the locations of these samples. Several SVOC's (mostly PAHs) were found to be slightly elevated in both background samples compared to the background sample collected during the 2004 PA/SI. These elevated concentrations may be impacts from previous site operations or from other anthropogenic activities. Because the data may not be representative of actual background surface soil conditions, the background SVOC surface soil concentrations from the 2004 PA/SI were also used for comparison purposes when developing the significant hits tables.

SEDIMENT: The VOCs Acetone and 2-butanone were detected above the CRQL in samples SED-02 (E1544), SED-03 (E1545), SED-04 (E1546) SED-05 (E1547) SED-06 (E1548), and in background sample SED-08 (E1560). These two compounds are common lab contaminants. No significant PCBs were detected in any of the sediment samples.

SVOCs (mainly PAHs) were detected above the CRQLs in all the background sediment samples at relatively low concentrations. Samples SED-01 (ME1543/E1543) and SED-06 (ME1548/E1543) were both upstream background samples collected in the ditch along the entrance drive to the Bucyrus WWTP. SED-01 (ME1543/E1543) was collected near the entrance drive just downstream of a 3' diameter corrugated HDPE tile which carries storm water runoff into the ditch. SED-06 (ME1548/E1548) was collected approximately 50 yards further upstream in the ditch. Metals concentrations in the two background samples were relatively similar. Several SVOC (PAH) concentrations were near 2 times the CRQL or less.

Sample SED-02 (ME1544/E1544) and SED-04 (ME1546/E1546) DUP were collected in the Sandusky River upstream of the Bucyrus WWTP outfall. Lead was detected in this sample at concentrations of 124 mg/kg and 1810 mg/kg. The correlation between these two sample results for this parameter is poor. Cadmium (1.6 mg/kg) and Zinc (785 mg/kg) were also detected at elevated concentrations in duplicate sample SED-04 (ME1546/E1546), but not in sample SED-02 (ME1544/E1544). Again, the results of these samples are suspect. There were no significant SVOC, Pesticide, or PCB detections in either of these samples.

Sample SED-03 (ME1545/E1545) was collected in the Sandusky River 50' upstream of the Bucyrus WWTP outfall. Significant TAL Metals results include: Cadmium at 1.5 mg/kg, Lead at 560 mg/kg, and Zinc at 307 mg/kg. There were no significant SVOC, Pesticide, or PCB detections in this sample.

Sample SED-05 (ME1547/E1547) was collected in a surface drainage swale on the west side of the entrance driveway to the Bucyrus WWTP. This location is near the SE corner of the limit of fill and contains a culvert that drains under the access road and into the east perimeter ditch. The sample was taken at a water seep emanating from the subsurface. It was unclear if the seep was a leachate outbreak or shallow ground water. SED-05 (ME1547/E1547) was compared to ditch background samples SED-01 (ME1543/E1543) and SED-06 (ME1548/E1548). Metals concentrations in excess of 3 times background included Cadmium (8.7 mg/kg), Copper (211 mg/kg), Lead (146 mg/kg), Nickel (148 mg/kg), and Zinc (904 mg/kg). SVOCs Phenanthrene, Fluoranthene, and Pyrene were detected at low concentrations of 340 ug/kg, 490 ug/kg, and 470 ug/kg respectively. A single Pesticide gamma-Chlordane was detected at 5.5 ug/kg.

SED-07 (ME1549/E1549) is also an upstream background river sample that was collected approximately 5' upstream of the confluence of the ditch and the Sandusky River. This sample had slightly higher concentrations than background river sample SED-08 (ME1560/E1560). For this reason, it was not used as background for comparison purposes to downstream river samples SED-02 (ME1544/E1544) and SED-04 DUP (ME1546/E1546), and SED-03 (ME1545/E1545). There were no significant TAL metals or PCBs detected in this background sample. Several SVOCs (PAHs) were detected in the sample at 2 and 3 times the CRQL. The following Pesticides were detected: Heptachlor epoxide (4.3 ug/kg), 4,4'-DDE (19.0 ug/kg), and 4,4'-DDT (59 ug/kg).

Sample SED-08 (ME1560/E1560) was an upstream background river sample that appears to be unaffected by the dump. It was collected in the Sandusky River on the north side approximately 50 yards upstream of the footbridge. This sample was the uppermost background river sample. This sample was used for comparison of downstream river samples SED-02 (ME1544), SED-03 (ME1545), and SED-04 DUP (ME1546). No Pesticides or PCBs were detected in this background sample. As indicated previously, Several SVOCs (PAHs) were detected in the sample at 1 to 2 times the CRQL.

Due to the elevated concentrations of Total Metals and SVOCs in the background samples taken in the Sandusky River upstream of the site, sample results were compared to Sediment Reference Values (SRVs), Threshold Effect Concentration (TEC) and Probable Effects Concentration (PEC) values. Appendix H contains Excel tables which detail SRVs, TEC, and PEC values. Below is a summary of these comparisons.

- VOC results were reflective of good sediment quality.
- PCB results were reflective of good sediment quality – all values were below (Maximum Detection Limits (MDLs).
- SVOC – several sediment samples had slightly elevated PAH compounds, with values above TEC levels. However, no sediment samples were elevated above PEC levels. Based on the sediment results, SVOCs were not likely to have impacts on sediment dwelling organisms.
- Pesticides – several sediment samples had slightly elevated pesticides, with values above TEC levels. However, no sediment samples were elevated above PEC levels. Based on the sediment results, pesticides were not likely to have impacts on sediment dwelling organisms.
- Metals – sediment samples SE-03, SE-04, and SE-05 indicated contaminated levels, with several metal parameters significantly above PEC levels. Results from these three sediment samples suggest that metals were at levels likely toxic to sediment dwelling organisms.

SURFACE WATER: Three VOCs were detected at very low concentrations, one in each sample SW-04 (E1564), SW-05 (E1655), and background sample SW-07 (E1657). The concentrations were well below the CRQL. Methylene Chloride was also detected at very low concentrations in all surface water samples including the lab blank. These concentrations were also below the CRQL. There were no significant VOC detections.

Several semi-volatile organic compounds were detected at estimated concentrations well below the CRQL in most of the surface water samples, including the background samples. Benzaldehyde, Butylbenzylphthalate, and Bis (2-ethylhexyl) phthalate were detected in similar concentrations in the lab blank. Di-n-butylphthalate and 3,3'-Dichlorobenzidine were detected in most of the samples including background well below the CRQL. Caprolactam was detected in SW-05 (E1565) at an estimated concentration of 0.56ug/L. 4-Chloroaniline and Hexachlorocyclopentadiene were also detected at estimated concentrations in most of the samples including background well below the CRQL. These SVOC detections are considered insignificant.

Several pesticides were detected at estimated concentrations at or below the CRQL in most of the surface water samples including the background samples. Because these contaminants are in the background samples and were detected at very low concentrations, they are considered insignificant.

There were no PCBs detected in any of the surface water samples.

The following paragraphs discuss the inorganic sample results for surface water:

Samples SW-01 (ME1561) and SW-06 (ME1566) were both upstream background samples collected in the ditch along the entrance driveway to the Bucyrus WWTP. SW-01 (ME1561) was collected near the entrance drive just downstream of a 3' diameter corrugated HDPE tile which carries storm water runoff into the ditch. SW-06 (ME1566) was collected approximately 50 yards further upstream in the ditch. Copper was estimated at 29 ug/L in ditch background sample SW-01 (ME1561), however a duplicate analysis showed an estimate of 2.8 ug/L. In ditch background sample SW-06 (ME1566) just upstream, Copper was estimated at 5.2 ug/L. No other significant TAL metals concentrations were noted in the background samples.

Sample SW-02 (ME1562) and SW-04 (ME1564) DUP were collected in the Sandusky River upstream of the Bucyrus WWTP primary outfall. The duplicate analytical results are elevated well above the results for SW-02 (ME1562). Significant TAL Metals detected in these two samples include: Aluminum at 14,600 ug/L, Barium at 488 ug/L, Calcium at 184,000 ug/L, Chromium at 36.9 ug/L, Copper at 330 ug/L, Iron at 25,100 ug/L, Lead at 1270 ug/L, Magnesium at 64,500 ug/L, Manganese at 1190 ug/L, Nickel at 53 ug/L, Potassium at 23,600 ug/L, Sodium at 55,500 ug/L and Zinc at 3890 ug/L.

Sample SW-03 (ME1563) was collected in the Sandusky River 50' upstream of the Bucyrus WWTP outfall. Significant TAL Metals results include: Aluminum at 10,700 ug/L, Barium at 349 ug/L, Calcium at 114,000 ug/L, Chromium at 20.4 ug/L, Copper at 133 ug/L, Iron at 33,200 ug/L, Lead at 555 ug/L, Magnesium at 57,200 ug/L, Manganese at 1450 ug/L, Nickel at 65.4 ug/L, and Sodium at 52,800 ug/L.

Sample SW-05 (ME1565) was collected in a surface drainage swale on the west side of the entrance driveway to the Bucyrus WWTP. This location is near the SE corner of the limit of fill and contains a culvert that drains under the access road and into the east perimeter ditch. The water sample appeared to be emanating from the subsurface, but it was unclear if the location was a leachate outbreak or shallow ground water. SW-05 (ME1565) was compared to ditch background samples SW-01 (ME1561) and SW-06 (ME1566). Significant TAL Metals detected include: Aluminum at 5740 ug/L, Barium at 230 ug/L, Cadmium at 21.5 ug/L, Chromium at 7.8 ug/L, Copper at 249 ug/L, Iron at 16,200 ug/L, Lead at 263 ug/L, Manganese 705 ug/L, Nickel at 265 ug/L, and Zinc at 1620 ug/L.

Sample SW-07 (ME1567) was an upstream background sample that appears to be unaffected by the dump. This sample was collected in the Sandusky River 5' upstream of the confluence of the east perimeter ditch and the Sandusky River. This sample had similar concentrations (slightly less) as background river sample SW-08 (ME1568). For this reason, SW-07 (ME1567) was used as background for comparison purposes to downstream river samples SW-02 (ME1562) and SW-04 DUP (ME1564), and SW-03 (ME1563).

Sample SW-08 (ME1568) was collected in the Sandusky River on the north side of the river approximately 50 yards upstream of the footbridge. This sample was the uppermost background river sample. As indicated in the previous paragraph, the concentrations were slightly higher than SW-07 (ME1567) so it was not used for river background comparison purposes. There were no significant TAL metals detected in this sample.

GROUND WATER: Ground water was not sampled during the ESI.

AIR: Air samples were not collected during the ESI.

4.1. Field Screening and Sampling Results

Field screening was performed using photo ionization detectors (PID) during soil sampling. GeoProbe core samples and surface soil samples were screened to determine the presence of volatile organic compounds (VOCs).

4.2. Comparison of Field Screening and Sampling Results to Screening Levels Criteria

No significant detections of VOCs were observed in any of the soil samples that were screened using a PID.

5.0 DISCUSSION

5.1. Migration and Exposure Pathways

Soil Exposure Pathway: The Bucyrus City Dump is located in a suburban area in Bucyrus, Ohio. There are residences to the south and west of the site. There is a cemetery to the east of the site. The public has unrestricted access via a public walking trail that leads to the Sandusky River and to a foot bridge that goes over the river to a park on the other side. The backyards of residences to the south are adjacent to the property boundary of the site, but not to the limits of fill (Figure 2). The closest residence to the fill area is approximately 440 feet away.

The City of Bucyrus operates a licensed composting facility on the property. Workers and the public have access to this area. There appears to be plenty of cover soils over waste material in this area and direct contact with wastes is unlikely.

The Bucyrus WWTP is located directly to the west of the dump. There is a chain link fence around the WWTP that is locked after business hours. WWTP workers primarily conduct their job duties within the fenced areas of the plant.

The northern portion of the dump appears to have adequate cover soils and is well vegetated. The southern portion was recently covered with approximately 2 feet of soil and will be seeded to establish vegetation in the Spring of 2007. Burrowing rodents are prevalent along the northern slope of the site near the Sandusky River and they are exposing waste in these areas. However, children and other trespassers primarily use the existing access road to approach the foot bridge. Once the new walking path is established east of the fill area, direct contact threats will be further minimized. The dump area is mowed on a regular basis by City employees.

Some contaminants are present in the subsurface soils at concentrations slightly above health screening levels. Sample results from deeper borings were near background concentrations, indicating little if any contaminant migration vertically.

Ground Water Exposure Pathway: Ground water was not sampled during the ESI based on results from previous sampling. The following is a discussion of this pathway from the 2004 PA/SI: Most of the residents down gradient of the site utilize public water systems. The average static water level depth to ground water for public and private wells is 20 feet. The available well logs can be found in Appendix C. See Appendix B for a complete data base table and Geographical Information System (GIS) 4-mile radius maps. The total population within a 4-mile radius of the site is 14,921 (Reference 4).
In the Bucyrus area, like much of central Crawford County, groundwater use is restricted to the shallow glacial till sediments, instead of the deeper aquifer, which generally produce less than three gallons per minute (ODNR Water Division map). There are approximately 8 residential wells less than ½ mile from the site (ODNR Well Logs).

Shallow ground water appears to be flowing from the east to west in the vicinity of the site. Residential wells were sampled along Krauter and Kerstetter Road.

Surface Water Exposure Pathway: Both the WWTP and the dump site are located adjacent to each other on the same parcel of land owned by the City of Bucyrus. The dump site is located within the floodplain of the Sandusky River and is immediately east or upstream of the WWTP relative to river flow. The river borders the entire northern boundary of the dump. Surface water on the site flows overland to the east and north, eventually discharging into the Sandusky River upstream of the dump. The potential for release of contaminants via overland migration is minimal, primarily due to cover and drainage improvements made to the northwest, south, and eastern portions of the site. The potential for release of contaminants due to flooding is high in the Sandusky River in a segment approximately 300 feet in length along the north slope that is being affected by erosion and washout. Within this 300 foot segment, waste materials and leachate seeps were observed entering into the river, which floods an average of two times a year primarily during the spring months. Upon installation of sheet piling in this area, the waste materials and leachate should be effectively contained within the dump site. Previously noted areas of leachate and washout in the east perimeter ditch have been eliminated due to the relocation of this ditch.

The Sandusky River is designated in the Ohio Water Quality Standards as Warm Water Habitat (WWH). The segment of the river immediately upstream of the Bucyrus WWTP and bordering the northern boundary of the adjacent dump site is in non-attainment for aquatic life habitat. The impact to the river in this segment is severe due to organic loadings from several combined sewer overflows (CSOs) from the City of Bucyrus, which are located both upstream of the site and at the site. The effluent and bypass discharges from the WWTP into the Sandusky River are located downstream (west) of the dump and upstream (east) of Kerstetter Road. This section of the river (downstream of the dump and the WWTP) is in partial attainment of the aquatic life use and impacts are largely attributed to nutrient enrichment from urban and agricultural practices within the watershed, in addition to pollution from point sources such as CSOs and the WWTP. Segments of the Sandusky River upstream of the City of Bucyrus are also in non-attainment status primarily due to agricultural practices. The Sandusky River is also designated as primary contact for recreation use in the City of Bucyrus area.

Historical sediment sampling events in the Sandusky River in the vicinity of the dump site and the Bucyrus WWTP have shown elevated levels of heavy metals, PCBs and PAHs. The General Electric Lamp Facility was identified as a major source of elevated mercury due to documented discharges of this contaminant to the sanitary sewer system. This collection system is comprised of 60 percent combined sewers with 16 combined sewer overflows that discharge directly to the river during major storm events. Metals including Mercury (2004 PA/SI) were also found in surface soils at the dump site in past investigations and may have contributed to sediment contamination in the river. PAH contaminants and PCBs have been attributed primarily to CSO discharges into the river. PAH contaminants were found in soils at the dump site and may have contributed to sediment concentrations in the river. PAHs are by-products of fossil fuel combustion and are contained in coal tar and creosote. Because river sediments upstream of the dump also contain PAHs and metals, it is difficult to attribute downstream contamination to the dump site.

The City of Bucyrus contains several active train rails that are sources of PAH contaminants to storm water. Pesticides were detected in the dump site and in river and ditch sediments, including background samples. It is likely that agricultural practices have contributed to these contaminants in the river and ditch sediments, and possibly in the dump. The Ohio Department of Health has historically advised that fish consumption be limited due to mercury and PCB levels in river sediment. This is especially a concern due to the popularity of sport fishing in the area (Biological and Water Quality Study of the Sandusky River and Selected Tributaries, Technical Report

EAS/1991-6-2). Please refer to Appendix F for the Sandusky-Bucyrus Assessment Unit, Pages 35-51 of the Biological and Water Quality Study. Locations of industry and other potential upstream sources of contaminants in river sediments are displayed in Figure 1A.

Sensitive environments were identified as potential targets in the surface water pathway. Species which are located within the 15-mile target distance limit (TDL) are either state endangered or state and federally threatened. Please refer to Appendix B for a list of the species and their distance from the site. No fish advisories have been reported within the 15-mile TDL.

Many of the residences are using public surface water sources for drinking water (City of Bucyrus WTP). The intake for these public water sources is upstream of the dump site. Only a few of the residences surrounding the site are still on private ground water wells.

Air Exposure Pathway: A comprehensive air sampling program was not implemented at the site during the ESI sampling event. However, portable air monitoring was conducted during soil sampling and did not detect anything above background. The estimated population within a 4-mile radius of the facility is 14,921.

5.2. U.S. EPA Removal Actions

No removal actions have been performed at this site.

6.0. CONCLUSIONS AND SITE RECOMMENDATION

Surface water and direct contact threats were previously identified from the 2004 PA/SI. These two pathways still have the potential to affect human health and the environment based on the sample results of the ESI. However recent and ongoing improvements to the WWTP, sewerage collection facilities, and maintenance activities at the dump have greatly minimized the potential for contaminant migration and potential exposures.

Potential direct contact threats continue to exist along the north slope of the dump due to waste being exposed by ground hogs. Little if any human activity occurs in this area because of steep slopes and heavy vegetation. Eliminating the ground hogs and the application of additional cover soils in this area would further minimize or eliminate the potential for erosion and direct contact with waste.

Potential surface water threats continue to exist in the river due to leachate seeps. These discharges are likely contributing to metals contamination in river water and sediment. Planned installation of sheet piling and other barriers should minimize or eliminate ongoing leachate seeps into the river. The realignment of the east perimeter ditch has eliminated previously identified concerns with exposed waste and leachate seeps.

7.0. REFERENCE PAGE/ATTACHMENTS

REFERENCES

1. Biological and Water Quality Study of the Sandusky River and Selected Tributaries 2001 - Seneca, Wyandot, and Crawford Counties, Ohio; May 21, 2003.

2. United States Environmental Protection Agency. Hazard Ranking System Guidance Manual. Publication 9345.1-07. PB92-963377. EPA 540-R-92-026. November 2002.

3. Ohio Environmental Protection Agency (Ohio EPA), Northwest District Office files.

4. Ohio EPA; Data; Geographical Information Systems.

5. Ohio Department of Transportation, Dept. Of Aerial Engineering, Historical Aerial Photographs; 1956-1988.

6. Quality Assurance Project Plan (QAPP), for Region V Superfund SI activities for Ohio EPA, and the Ohio EPA Field Standard Operating Procedures.

ATTACHMENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Complete Analytical Results	Appendix A
GIS Maps and Data	Appendix B
Well Logs	Appendix C
Photographic Log	Appendix D
Test Boring Records	Appendix E
Sandusky-Bucyrus Assessment Unit	Appendix F
PA/SI Analytical Results (2004)	Appendix G
Sediment Analysis Documents	Appendix H

APPENDIX G

PA/SI ANALYTICAL RESULTS

Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1269
BUCYRUS CITY DUMP
CEIMIC

Number of Soil Samples : 10
Number of Water Samples : 0

Sample Number :	E1269	E1280	E1280MS	E1280MSD	E1281
Sampling Location :	GP-SO-10	GP-SO-01	GP-SO-01	GP-SO-01	GP-SO-02
Matrix :	Soil	Soil	Soil	Soil	Soil
Units :	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Date Sampled :	6/2/2004	6/2/2004	6/2/2004	6/2/2004	6/2/2004
Time Sampled :	17:45	15:30	15:30	15:30	16:24
%Moisture :	25	18	18	18	27
pH :	7.0	7.0	7.0	7.0	7.0
Dilution Factor :	1.0	1.0	1.0	1.0	1.0

Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	13	U	12	U	13	U	13	U	14	U
CHLOROMETHANE	13	U	12	U	13	U	13	U	14	U
VINYL CHLORIDE	13	U	12	U	13	U	13	U	14	U
BROMOMETHANE	13	U	12	U	13	U	13	U	14	U
CHLOROETHANE	13	U	12	U	13	U	13	U	14	U
TRICHLOROFLUOROMETHANE	13	U	12	U	13	U	13	U	14	U
1,1-DICHLOROETHENE	13	U	12	UJ	34		32		14	U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	13	U	12	U	13	U	13	U	14	U
ACETONE	38	J	170	J	140	J	200	J	97	J
CARBON DISULFIDE	13	U	12	U	1	J	1	J	2	J
METHYL ACETATE	13	U	12	U	13	U	2	J	14	U
METHYLENE CHLORIDE	19	UJ	21	UJ	21	UJ	23	UJ	19	UJ
TRANS-1,2-DICHLOROETHENE	13	U	12	U	13	U	13	U	14	U
METHYL TERT-BUTYL ETHER	13	U	12	U	13	U	13	U	14	U
1,1-DICHLOROETHANE	13	U	12	U	13	U	13	U	14	U
CIS-1,2-DICHLOROETHENE	13	U	12	U	13	U	13	U	14	U
2-BUTANONE	10	J	52		42		70		23	
CHLOROFORM	13	U	12	U	13	U	13	U	14	U
1,1,1-TRICHLOROETHANE	13	U	12	U	13	U	13	U	14	U
CYCLOHEXANE	13	U	12	U	13	U	13	U	14	U
CARBON TETRACHLORIDE	13	U	12	U	13	U	13	U	14	U
BENZENE	13	U	12	UJ	36		35		14	U
1,2-DICHLOROETHANE	13	U	12	U	13	U	13	U	14	U
TRICHLOROETHENE	13	U	12	UJ	26		25		14	U
METHYLCYCLOHEXANE	13	U	12	U	2	J	13	U	3	J
1,2-DICHLOROPROPANE	13	U	12	U	13	U	13	U	14	U
BROMODICHLOROMETHANE	13	U	12	U	13	U	13	U	14	U
CIS-1,3-DICHLOROPROPENE	13	UJ	12	UJ	13	UJ	13	UJ	14	UJ
4-METHYL-2-PENTANONE	13	U	12	U	13	U	13	U	14	U
TOLUENE	13	U	12	UJ	26		26		14	U
TRANS-1,3-DICHLOROPROPENE	13	UJ	12	UJ	13	UJ	13	UJ	14	UJ
1,1,2-TRICHLOROETHANE	13	U	12	U	13	U	13	U	14	U
TETRACHLOROETHENE	2	J	2	J	2	J	1	J	2	J

DISCLAIMER: This package has been electronically assessed as an added service to our customer. It has not been either validated or approved by Region 5 and any subsequent use by the data user is strictly at the risk of the data user. Region 5 assumes no responsibility for use of unvalidated data.

Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1269
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1269		E1280		E1280MS		E1280MSD		E1281	
Sampling Location :	GP-SO-10		GP-SO-01		GP-SO-01		GP-SO-01		GP-SO-02	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	17:45		15:30		15:30		15:30		16:24	
%Moisture :	25		18		18		18		27	
pH :	7.0		7.0		7.0		7.0		7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	13	U	9	J	13	U	13	U	15	
DIBROMOCHLOROMETHANE	13	U	12	U	13	U	13	U	14	U
1,2-DIBROMOETHANE	13	U	12	U	13	U	13	U	14	U
CHLOROBENZENE	2	J	1	J	22		21		2	J
ETHYLBENZENE	3	J	12	U	13	U	13	U	14	U
XYLENES (TOTAL)	24		12	U	13	U	13	U	5	J
STYRENE	13	U	12	U	13	U	13	U	14	U
BROMOFORM	13	U	12	U	13	U	13	U	14	U
ISOPROPYLBENZENE	2	J	12	U	13	U	13	U	5	J
1,1,2,2-TETRACHLOROETHANE	13	U	7	J	13	U	13	U	14	U
1,3-DICHLOROBENZENE	13	U	12	U	13	U	13	U	14	U
1,4-DICHLOROBENZENE	5	J	4	J	5	J	3	J	5	J
1,2-DICHLOROBENZENE	4	J	3	J	5	J	3	J	4	J
1,2-DIBROMO-3-CHLOROPROPANE	13	R	12	R	13	R	13	R	14	R
1,2,4-TRICHLOROBENZENE	1	J	12	U	2	J	13	U	14	U

Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1269
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1282		E1283		E1284		E1285		E1286	
Sampling Location :	GP-SO-03		SO-04		SO-05		SO-06		SO-07	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/3/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	17:15		15:35		11:45		12:10		12:15	
%Moisture :	22		30		18		26		29	
pH :	7.0		7.0		7.0		7.0		7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	13	U	14	U	13	U	14	U	15	U
CHLOROMETHANE	13	U	14	U	13	U	14	U	15	U
VINYL CHLORIDE	2	J	14	U	13	U	14	U	15	U
BROMOMETHANE	13	U	14	U	13	U	14	U	15	U
CHLOROETHANE	13	U	14	U	13	U	14	U	15	U
TRICHLOROFLUOROMETHANE	13	U	14	U	13	U	14	U	15	U
1,1-DICHLOROETHENE	13	U	14	U	13	U	14	U	15	U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	13	U	14	U	13	U	14	U	15	U
ACETONE	33	J	14	UJ	13	UJ	14	UJ	15	UJ
CARBON DISULFIDE	3	J	14	U	13	U	14	U	15	U
METHYL ACETATE	13	U	14	U	13	U	14	U	15	U
METHYLENE CHLORIDE	20	UJ	14	UJ	13	UJ	14	UJ	15	UJ
TRANS-1,2-DICHLOROETHENE	13	U	14	U	13	U	14	U	15	U
METHYL TERT-BUTYL ETHER	13	U	14	U	13	U	14	U	15	U
1,1-DICHLOROETHANE	13	U	14	U	13	U	14	U	15	U
CIS-1,2-DICHLOROETHENE	13	U	14	U	13	U	14	U	15	U
2-BUTANONE	9	J	14	U	13	U	14	U	15	U
CHLOROFORM	13	U	14	U	13	U	14	U	15	U
1,1,1-TRICHLOROETHANE	13	U	14	U	13	U	14	U	15	U
CYCLOHEXANE	8	J	14	U	13	U	14	U	15	U
CARBON TETRACHLORIDE	13	U	14	U	13	U	14	U	15	U
BENZENE	3	J	14	U	13	U	14	U	15	U
1,2-DICHLOROETHANE	13	U	14	U	13	U	14	U	15	U
TRICHLOROETHENE	13	U	14	U	13	U	14	U	15	U
METHYLCYCLOHEXANE	45		14	U	13	U	14	U	15	U
1,2-DICHLOROPROPANE	13	U	14	U	13	U	14	U	15	U
BROMODICHLOROMETHANE	13	U	14	U	13	U	14	U	15	U
CIS-1,3-DICHLOROPROPENE	13	UJ	14	UJ	13	UJ	14	UJ	15	UJ
4-METHYL-2-PENTANONE	13	U	14	U	13	U	14	U	15	U
TOLUENE	20		14	U	13	U	14	U	15	U
TRANS-1,3-DICHLOROPROPENE	13	UJ	14	UJ	13	UJ	14	UJ	15	UJ
1,1,2-TRICHLOROETHANE	13	U	14	U	13	U	14	U	15	U
TETRACHLOROETHENE	13	U	14	U	13	U	14	U	15	U

Case #: 32948
SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1282		E1283		E1284		E1285		E1286	
Sampling Location :	GP-SO-03		SO-04		SO-05		SO-06		SO-07	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/3/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	17:15		15:35		11:45		12:10		12:15	
%Moisture :	22		30		18		26		29	
pH :	7.0		7.0		7.0		7.0		7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	45		14	U	13	U	14	U	15	U
DIBROMOCHLOROMETHANE	13	U	14	U	13	U	14	U	15	U
1,2-DIBROMOETHANE	13	U	14	U	13	U	14	U	15	U
CHLOROBENZENE	13	U	14	U	13	U	14	U	15	U
ETHYLBENZENE	7	J	14	U	13	U	14	U	15	U
XYLENES (TOTAL)	17		14	U	13	U	14	U	15	U
STYRENE	13	U	14	U	13	U	14	U	15	U
BROMOFORM	13	U	14	U	13	U	14	U	15	U
ISOPROPYLBENZENE	3	J	14	U	13	U	14	U	15	U
1,1,2,2-TETRACHLOROETHANE	13	U	14	U	13	U	14	U	15	U
1,3-DICHLOROBENZENE	13	U	14	U	13	U	14	U	15	U
1,4-DICHLOROBENZENE	3	J	3	J	2	J	3	J	3	J
1,2-DICHLOROBENZENE	4	J	2	J	2	J	2	J	2	J
1,2-DIBROMO-3-CHLOROPROPANE	13	R	14	R	13	R	14	R	15	R
1,2,4-TRICHLOROBENZENE	13	U	14	U	13	U	14	U	15	U

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1269
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1287		E1288		VBLKOJ		VBLKOL		VHBLK01	
Sampling Location :	SO-08		SO-09							
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004							
Time Sampled :	15:55		11:30							
%Moisture :	35		30		N/A		N/A		0	
pH :	7.0		7.0						7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	15	U	14	U	10	U	10	U	10	U
CHLOROMETHANE	15	U	14	U	10	U	10	U	10	U
VINYL CHLORIDE	15	U	14	U	10	U	10	U	10	U
BROMOMETHANE	15	U	14	U	10	U	10	U	10	U
CHLOROETHANE	15	U	14	U	10	U	10	U	10	U
TRICHLOROFLUOROMETHANE	15	U	14	U	10	U	10	U	10	U
1,1-DICHLOROETHENE	15	U	14	U	10	U	10	U	10	U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	15	U	14	U	10	U	10	U	10	U
ACETONE	15	UJ	14	UJ	10	UJ	3	J	10	U
CARBON DISULFIDE	15	U	14	U	10	U	10	U	10	U
METHYL ACETATE	15	U	14	U	10	U	10	U	10	U
METHYLENE CHLORIDE	19	UJ	14	UJ	3	J	6	J	10	J
TRANS-1,2-DICHLOROETHENE	15	U	14	U	10	U	10	U	10	U
METHYL TERT-BUTYL ETHER	15	U	14	U	10	U	10	U	10	U
1,1-DICHLOROETHANE	15	U	14	U	10	U	10	U	10	U
CIS-1,2-DICHLOROETHENE	15	U	14	U	10	U	10	U	10	U
2-BUTANONE	15	U	14	U	10	U	10	U	10	U
CHLOROFORM	15	U	14	U	10	U	10	U	10	U
1,1,1-TRICHLOROETHANE	15	U	14	U	10	U	10	U	10	U
CYCLOHEXANE	15	U	14	U	10	U	10	U	10	U
CARBON TETRACHLORIDE	15	U	14	U	10	U	10	U	10	U
BENZENE	15	U	14	U	10	U	10	U	10	U
1,2-DICHLOROETHANE	15	U	14	U	10	U	10	U	10	U
TRICHLOROETHENE	15	U	14	U	10	U	10	U	10	U
METHYLCYCLOHEXANE	15	U	14	U	10	U	10	U	10	U
1,2-DICHLOROPROPANE	15	U	14	U	10	U	10	U	10	U
BROMODICHLOROMETHANE	15	U	14	U	10	U	10	U	10	U
CIS-1,3-DICHLOROPROPENE	15	UJ	14	UJ	10	UJ	10	U	10	U
4-METHYL-2-PENTANONE	15	U	14	U	10	U	10	U	10	U
TOLUENE	15	U	14	U	10	U	10	U	10	U
TRANS-1,3-DICHLOROPROPENE	15	UJ	14	UJ	10	UJ	10	U	10	U
1,1,2-TRICHLOROETHANE	15	U	14	U	10	U	10	U	10	U
TETRACHLOROETHENE	2	J	14	U	10	U	10	U	10	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1287		E1288		VBLKOJ		VBLKOL		VHBLK01	
Sampling Location :	SO-08		SO-09							
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004							
Time Sampled :	15:55		11:30							
%Moisture :	35		30		N/A		N/A		0	
pH :	7.0		7.0						7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	15	U	14	U	10	U	10	U	10	U
DIBROMOCHLOROMETHANE	15	U	14	U	10	U	10	U	10	U
1,2-DIBROMOETHANE	15	U	14	U	10	U	10	U	10	U
CHLOROBENZENE	15	U	14	U	10	U	10	U	10	U
ETHYLBENZENE	15	U	14	U	10	U	10	U	10	U
XYLENES (TOTAL)	15	U	14	U	10	U	10	U	10	U
STYRENE	15	U	14	U	10	U	10	U	10	U
BROMOFORM	15	U	14	U	10	U	10	U	10	U
ISOPROPYLBENZENE	15	U	14	U	10	U	10	U	10	U
1,1,2,2-TETRACHLOROETHANE	15	U	14	U	10	U	10	U	10	U
1,3-DICHLOROBENZENE	15	U	14	U	10	U	10	U	10	U
1,4-DICHLOROBENZENE	4	J	2	J	10	U	10	U	10	U
1,2-DICHLOROBENZENE	3	J	2	J	10	U	10	U	10	U
1,2-DIBROMO-3-CHLOROPROPANE	15	R	14	R	10	R	10	R	10	R
1,2,4-TRICHLOROBENZENE	15	U	14	U	10	U	10	U	10	U

Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1269
BUCYRUS CITY DUMP
CEIMIC

Number of Soil Samples : 10
Number of Water Samples : 0

Sample Number :	E1269		E1269DL		E1280		E1280MS		E1280MSD	
Sampling Location :	GP-SO-10		GP-SO-10		GP-SO-01		GP-SO-01		GP-SO-01	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	17:45		17:45		15:30		15:30		15:30	
%Moisture :	17		17		20		20		20	
pH :	7.8		7.8		7.8		7.8		7.8	
Dilution Factor :	1.0		4.0		6.0		6.0		6.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	390	UJ	1600	UJ	2500	UJ	2500	UJ	2500	UJ
PHENOL	390	U	1600	U	2500	U	2200	J	2000	J
BIS-(2-CHLOROETHYL)ETHER	390	U	1600	U	2500	U	2500	U	2500	U
2-CHLOROPHENOL	390	U	1600	U	2500	U	1700	J	1800	J
2-METHYLPHENOL	390	U	1600	U	2500	U	2500	U	2500	U
2,2'-OXYBIS(1- CHLOROPROPANE)	390	U	1600	U	2500	U	2500	U	2500	U
ACETOPHENONE	390	U	1600	U	2500	U	2500	U	2500	U
4-METHYLPHENOL	390	U	1600	U	2500	U	2500	U	2500	U
N-NITROSO-DI-N PROPYLAMINE	390	U	1600	U	2500	U	1000	J	1200	J
HEXACHLOROETHANE	390	U	1600	U	2500	U	2500	U	2500	U
NITROBENZENE	390	U	1600	U	2500	U	2500	U	2500	U
ISOPHORONE	390	U	1600	U	2500	U	2500	U	2500	U
2-NITROPHENOL	390	U	1600	U	2500	U	2500	U	2500	U
2,4-DIMETHYLPHENOL	390	U	1600	U	2500	U	2500	U	2500	U
BIS(2-CHLOROETHOXY)METHANE	390	U	1600	U	2500	U	2500	U	2500	U
2,4-DICHLOROPHENOL	390	U	1600	U	2500	U	2500	U	2500	U
NAPHTHALENE	54	J	1600	U	2500	U	2500	U	2500	U
4-CHLOROANILINE	390	U	1600	U	2500	U	2500	U	2500	U
HEXACHLOROBUTADIENE	390	U	1600	U	2500	U	2500	U	2500	U
CAPROLACTAM	390	U	1600	U	2500	U	2500	U	2500	U
4-CHLORO-3-METHYLPHENOL	390	U	1600	U	2500	U	2900		2300	J
2-METHYLNAPHTHALENE	69	J	1600	U	2500	U	2500	U	2500	U
HEXACHLOROCYCLO-PENTADIEN	390	U	1600	U	2500	U	2500	U	2500	U
2,4,6-TRICHLOROPHENOL	390	U	1600	U	2500	U	2500	U	2500	U
2,4,5-TRICHLOROPHENOL	990	U	4000	U	6200	U	6200	U	6200	U
1,1'-BIPHENYL	390	U	1600	U	2500	U	2500	U	2500	U
2-CHLORONAPHTHALENE	390	U	1600	U	2500	U	2500	U	2500	U
2-NITROANILINE	990	U	4000	U	6200	U	6200	U	6200	U
DIMETHYLPHTHALATE	390	U	1600	U	2500	U	2500	U	2500	U
2,6-DINITROTOLUENE	390	U	1600	U	2500	U	2500	U	2500	U
ACENAPHTHYLENE	390	U	1600	U	2500	U	2500	U	2500	U
3-NITROANILINE	990	U	4000	U	6200	U	6200	U	6200	U
ACENAPHTHENE	390	U	1600	U	2500	UJ	1800	J	1400	J

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1269		E1269DL		E1280		E1280MS		E1280MSD	
Sampling Location :	GP-SO-10		GP-SO-10		GP-SO-01		GP-SO-01		GP-SO-01	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	17:45		17:45		15:30		15:30		15:30	
%Moisture :	17		17		20		20		20	
pH :	7.8		7.8		7.8		7.8		7.8	
Dilution Factor :	1.0		4.0		6.0		6.0		6.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	990	U	4000	U	6200	U	6200	U	6200	U
4-NITROPHENOL	990	U	4000	U	6200	U	2800	J	2100	J
DIBENZOFURAN	390	U	1600	U	2500	U	2500	U	2500	U
2,4-DINITROTOLUENE	390	U	1600	U	2500	U	1700	J	1300	J
DIETHYLPHTHALATE	390	U	1600	U	2500	U	2500	U	2500	U
FLUORENE	390	U	1600	U	2500	U	2500	U	2500	U
4-CHLOROPHENYL-PHENYL ETHE	390	U	1600	U	2500	U	2500	U	2500	U
4-NITROANILINE	990	U	4000	U	6200	U	6200	U	6200	U
4,6-DINITRO-2-METHYLPHENOL	990	U	4000	U	6200	U	6200	U	6200	U
N-NITROSO DIPHENYLAMINE	390	U	1600	U	2500	U	2500	U	2500	U
4-BROMOPHENYL-PHENYLETHER	390	U	1600	U	2500	U	2500	U	2500	U
HEXACHLOROBENZENE	390	U	1600	U	2500	U	2500	U	2500	U
ATRAZINE	390	UJ	1600	UJ	2500	UJ	2500	UJ	2500	UJ
PENTACHLOROPHENOL	990	U	4000	U	6200	U	6200	U	6200	U
PHENANTHRENE	320	J	220	J	930	J	430	J	600	J
ANTHRACENE	65	J	1600	U	580	J	2500	U	490	J
CARBAZOLE	390	U	1600	U	2500	U	2500	U	2500	U
DI-N-BUTYLPHTHALATE	390	U	1600	U	2500	U	2500	U	2500	U
FLUORANTHENE	440		320	J	430	J	330	J	360	J
PYRENE	530		340	J	1100	J	2900		2700	
BUTYLBENZYLPHTHALATE	390	U	1600	U	2500	U	2500	U	2500	U
3,3'-DICHLOROBENZIDINE	390	U	1600	U	2500	U	2500	U	2500	U
BENZO(A)ANTHRACENE	220	J	1600	U	420	J	270	J	300	J
CHRYSENE	270	J	180	J	830	J	510	J	590	J
BIS(2-ETHYLHEXYL)PHTHALATE	9900		6700		630	J	1700	J	2100	J
DI-N-OCTYLPHTHALATE	390	U	1600	U	2500	U	2500	U	430	J
BENZO(B)FLUORANTHENE	200	J	1600	U	1300	J	2500	U	920	J
BENZO(K)FLUORANTHENE	220	J	1600	U	330	J	2500	U	2500	U
BENZO(A)PYRENE	220	J	1600	U	1600	J	2500	U	1900	J
INDENO(1,2,3-CD)-PYRENE	130	J	1600	U	1100	J	2500	U	940	J
DIBENZO(A,H)-ANTHRACENE	390	U	1600	U	800	J	2500	U	2500	U
BENZO(G,H,I)PERYLENE	170	J	1600	U	2800		640	J	2500	

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1281		E1281DL		E1282		E1282DL		E1283	
Sampling Location :	GP-SO-02		GP-SO-02		GP-SO-03		GP-SO-03		SO-04	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/3/2004	
Time Sampled :	16:24		16:24		17:15		17:15		15:35	
%Moisture :	36		36		43		43		32	
pH :	8.1		8.1		8.3		8.3		6.6	
Dilution Factor :	2.0		30.0		1.0		20.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	260	J	15000	UJ	160	J	12000	UJ	74	J
PHENOL	1000	U	15000	U	81	J	12000	U	480	U
BIS-(2-CHLOROETHYL)ETHER	1000	U	15000	U	580	U	12000	U	480	U
2-CHLOROPHENOL	1000	U	15000	U	580	U	12000	U	480	U
2-METHYLPHENOL	1000	U	15000	U	230	J	12000	U	480	U
2,2'-OXYBIS(1- CHLOROPROPANE)	1000	U	15000	U	580	U	12000	U	480	U
ACETOPHENONE	1000	U	15000	U	66	J	12000	U	480	U
4-METHYLPHENOL	1000	U	15000	U	220	J	12000	U	480	U
N-NITROSO-DI-N PROPYLAMINE	1000	U	15000	U	580	U	12000	U	480	U
HEXACHLOROETHANE	1000	U	15000	U	580	U	12000	U	480	U
NITROBENZENE	1000	U	15000	U	580	U	12000	U	480	U
ISOPHORONE	1000	U	15000	U	580	U	12000	U	480	U
2-NITROPHENOL	1000	U	15000	U	580	U	12000	U	480	U
2,4-DIMETHYLPHENOL	1000	U	15000	U	130	J	12000	U	480	U
BIS(2-CHLOROETHOXY)METHANE	1000	U	15000	U	580	U	12000	U	480	U
2,4-DICHLOROPHENOL	1000	U	15000	U	580	U	12000	U	480	U
NAPHTHALENE	190	J	15000	U	130	J	12000	U	480	U
4-CHLOROANILINE	1000	U	15000	U	580	U	12000	U	480	U
HEXACHLOROBUTADIENE	1000	U	15000	U	580	U	12000	U	480	U
CAPROLACTAM	1000	U	15000	U	580	U	12000	U	480	U
4-CHLORO-3-METHYLPHENOL	1000	U	15000	U	580	U	12000	U	480	U
2-METHYLNAPHTHALENE	260	J	15000	U	140	J	12000	U	480	U
HEXACHLOROCYCLO-PENTADIEN	1000	U	15000	U	580	U	12000	U	480	U
2,4,6-TRICHLOROPHENOL	1000	U	15000	U	580	U	12000	U	480	U
2,4,5-TRICHLOROPHENOL	2600	U	39000	U	1400	U	29000	U	1200	U
1,1'-BIPHENYL	1000	U	15000	U	580	U	12000	U	480	U
2-CHLORONAPHTHALENE	1000	U	15000	U	580	U	12000	U	480	U
2-NITROANILINE	2600	U	39000	U	1400	U	29000	U	1200	U
DIMETHYLPHTHALATE	1000	U	15000	U	580	U	12000	U	480	U
2,6-DINITROTOLUENE	1000	U	15000	U	580	U	12000	U	480	U
ACENAPHTHYLENE	1000	U	15000	U	580	U	12000	U	480	U
3-NITROANILINE	2600	U	39000	U	1400	U	29000	U	1200	U
ACENAPHTHENE	870	J	15000	U	580	U	12000	U	65	J

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1281		E1281DL		E1282		E1282DL		E1283	
Sampling Location :	GP-SO-02		GP-SO-02		GP-SO-03		GP-SO-03		SO-04	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/3/2004	
Time Sampled :	16:24		16:24		17:15		17:15		15:35	
%Moisture :	36		36		43		43		32	
pH :	8.1		8.1		8.3		8.3		6.6	
Dilution Factor :	2.0		30.0		1.0		20.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	2600	U	39000	U	1400	U	29000	U	1200	U
4-NITROPHENOL	2600	U	39000	U	1400	U	29000	U	1200	U
DIBENZOFURAN	450	J	15000	U	580	U	12000	U	49	J
2,4-DINITROTOLUENE	1000	U	15000	U	580	U	12000	U	480	U
DIETHYLPHTHALATE	1000	U	15000	U	580	U	12000	U	480	U
FLUORENE	1200		15000	U	78	J	12000	U	90	J
4-CHLOROPHENYL-PHENYL ETHE	1000	U	15000	U	580	U	12000	U	480	U
4-NITROANILINE	2600	U	39000	U	1400	U	29000	U	1200	U
4,6-DINITRO-2-METHYLPHENOL	2600	U	39000	U	1400	U	29000	U	1200	U
N-NITROSO DIPHENYLAMINE	1000	U	15000	U	580	U	12000	U	480	U
4-BROMOPHENYL-PHENYLETHER	1000	U	15000	U	580	U	12000	U	480	U
HEXACHLOROBENZENE	1000	U	15000	U	580	U	12000	U	480	U
ATRAZINE	1000	UJ	15000	UJ	580	UJ	12000	UJ	480	UJ
PENTACHLOROPHENOL	2600	U	39000	U	1400	U	29000	U	1200	U
PHENANTHRENE	670	J	15000	U	500	J	12000	U	950	
ANTHRACENE	210	J	15000	U	92	J	12000	U	180	J
CARBAZOLE	170	J	15000	U	580	U	12000	U	120	J
DI-N-BUTYLPHTHALATE	1000	U	15000	U	270	J	12000	U	480	U
FLUORANTHENE	330	J	15000	U	570	J	12000	U	1300	
PYRENE	470	J	15000	U	730		12000	U	1600	
BUTYLBENZYLPHTHALATE	1000	U	15000	U	540	J	12000	U	83	J
3,3'-DICHLOROBENZIDINE	1000	U	15000	U	580	U	12000	U	480	U
BENZO(A)ANTHRACENE	250	J	15000	U	300	J	12000	U	780	
CHRYSENE	340	J	15000	U	380	J	12000	U	930	
BIS(2-ETHYLHEXYL)PHTHALATE	60000		52000		37000		35000		3600	
DI-N-OCTYLPHTHALATE	1400		15000	U	550	J	12000	U	110	J
BENZO(B)FLUORANTHENE	200	J	15000	U	360	J	12000	U	850	
BENZO(K)FLUORANTHENE	180	J	15000	U	300	J	12000	U	750	
BENZO(A)PYRENE	190	J	15000	U	340	J	12000	U	760	
INDENO(1,2,3-CD)-PYRENE	120	J	15000	U	210	J	12000	U	600	
DIBENZO(A,H)-ANTHRACENE	1000	U	15000	U	580	U	12000	U	290	J
BENZO(G,H,I)PERYLENE	250	J	15000	UJ	280	J	12000	UJ	740	

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1284		E1285		E1286		E1287		E1287DL	
Sampling Location :	SO-05		SO-06		SO-07		SO-08		SO-08	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	11:45		12:10		12:15		15:55		15:55	
%Moisture :	18		27		23		46		46	
pH :	7.8		7.2		7.3		7.0		7.0	
Dilution Factor :	2.0		1.0		1.0		1.0		6.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	790	UJ	160	J	200	J	270	J	3600	UJ
PHENOL	790	U	450	U	420	U	600	U	3600	U
BIS-(2-CHLOROETHYL)ETHER	790	U	450	U	420	U	600	U	3600	U
2-CHLOROPHENOL	790	U	450	U	420	U	600	U	3600	U
2-METHYLPHENOL	790	U	450	U	420	U	600	U	3600	U
2,2'-OXYBIS(1- CHLOROPROPANE)	790	U	450	U	420	U	600	U	3600	U
ACETOPHENONE	790	U	450	U	420	U	600	U	3600	U
4-METHYLPHENOL	790	U	450	U	420	U	600	U	3600	U
N-NITROSO-DI-N PROPYLAMINE	790	U	450	U	420	U	600	U	3600	U
HEXACHLOROETHANE	790	U	450	U	420	U	600	U	3600	U
NITROBENZENE	790	U	450	U	420	U	600	U	3600	U
ISOPHORONE	790	U	450	U	420	U	600	U	3600	U
2-NITROPHENOL	790	U	450	U	420	U	600	U	3600	U
2,4-DIMETHYLPHENOL	790	U	450	U	420	U	600	U	3600	U
BIS(2-CHLOROETHOXY)METHANE	790	U	450	U	420	U	600	U	3600	U
2,4-DICHLOROPHENOL	790	U	450	U	420	U	600	U	3600	U
NAPHTHALENE	87	J	450	U	49	J	600	U	3600	U
4-CHLOROANILINE	790	U	450	U	420	U	600	U	3600	U
HEXACHLOROBUTADIENE	790	U	450	U	420	U	600	U	3600	U
CAPROLACTAM	790	U	450	U	420	U	600	U	3600	U
4-CHLORO-3-METHYLPHENOL	790	U	450	U	420	U	600	U	3600	U
2-METHYLNAPHTHALENE	97	J	450	U	65	J	600	U	3600	U
HEXACHLOROCYCLO-PENTADIEN	790	U	450	U	420	U	600	U	3600	U
2,4,6-TRICHLOROPHENOL	790	U	450	U	420	U	600	U	3600	U
2,4,5-TRICHLOROPHENOL	2000	U	1100	U	1100	U	1500	U	9100	U
1,1'-BIPHENYL	790	U	450	U	420	U	600	U	3600	U
2-CHLORONAPHTHALENE	790	U	450	U	420	U	600	U	3600	U
2-NITROANILINE	2000	U	1100	U	1100	U	1500	U	9100	U
DIMETHYLPHTHALATE	790	U	450	U	420	U	600	U	3600	U
2,6-DINITROTOLUENE	790	U	450	U	420	U	600	U	3600	U
ACENAPHTHYLENE	790	U	450	U	420	U	600	U	3600	U
3-NITROANILINE	2000	U	1100	U	1100	U	1500	U	9100	U
ACENAPHTHENE	170	J	450	U	48	J	600	U	3600	U

DISCLAIMER: This package has been electronically assessed as an added service to our customer. It has not been either validated or approved by Region 5 and any subsequent use by the data user is strictly at the risk of the data user. Region 5 assumes no responsibility for use of unvalidated data.

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1284		E1285		E1286		E1287		E1287DL	
Sampling Location :	SO-05		SO-06		SO-07		SO-08		SO-08	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	11:45		12:10		12:15		15:55		15:55	
%Moisture :	18		27		23		46		46	
pH :	7.8		7.2		7.3		7.0		7.0	
Dilution Factor :	2.0		1.0		1.0		1.0		6.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	2000	U	1100	U	1100	U	1500	U	9100	U
4-NITROPHENOL	2000	U	1100	U	1100	U	1500	U	9100	U
DIBENZOFURAN	130	J	450	U	45	J	600	U	3600	U
2,4-DINITROTOLUENE	790	U	450	U	420	U	600	U	3600	U
DIETHYLPHTHALATE	790	U	450	U	420	U	600	U	3600	U
FLUORENE	190	J	450	U	63	J	600	U	3600	U
4-CHLOROPHENYL-PHENYL ETHE	790	U	450	U	420	U	600	U	3600	U
4-NITROANILINE	2000	U	1100	U	1100	U	1500	U	9100	U
4,6-DINITRO-2-METHYLPHENOL	2000	U	1100	U	1100	U	1500	U	9100	U
N-NITROSO DIPHENYLAMINE	790	U	450	U	420	U	600	U	3600	U
4-BROMOPHENYL-PHENYLETHER	790	U	450	U	420	U	600	U	3600	U
HEXACHLOROBENZENE	790	U	450	U	420	U	600	U	3600	U
ATRAZINE	790	UJ	450	UJ	420	UJ	600	UJ	3600	UJ
PENTACHLOROPHENOL	2000	U	1100	U	1100	U	1500	U	9100	U
PHENANTHRENE	2300		550		950		320	J	3600	U
ANTHRACENE	330	J	120	J	200	J	70	J	3600	U
CARBAZOLE	250	J	78	J	86	J	600	U	3600	U
DI-N-BUTYLPHTHALATE	790	U	450	U	420	U	160	J	3600	U
FLUORANTHENE	3000		810		1600		570	J	440	J
PYRENE	3400		950		1800		660		510	J
BUTYLBENZYLPHTHALATE	790	U	450	U	420	U	18000		13000	
3,3'-DICHLOROBENZIDINE	790	U	450	U	420	U	600	U	3600	U
BENZO(A)ANTHRACENE	1500		470		950		320	J	3600	U
CHRYSENE	1800		620		1100		480	J	3600	U
BIS(2-ETHYLHEXYL)PHTHALATE	790	U	780		1000		540	J	3600	U
DI-N-OCTYLPHTHALATE	790	U	450	U	420	U	600	U	3600	U
BENZO(B)FLUORANTHENE	1500		550		1100		490	J	3600	U
BENZO(K)FLUORANTHENE	1600		610		840		350	J	3600	U
BENZO(A)PYRENE	1700		500		950		390	J	3600	U
INDENO(1,2,3-CD)-PYRENE	1200		460		750		370	J	3600	U
DIBENZO(A,H)-ANTHRACENE	610	J	230	J	380	J	600	U	3600	U
BENZO(G,H,I)PERYLENE	1400		530		850		510	J	3600	U

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1288		SBLKKU							
Sampling Location :	SO-09									
Matrix :	Soil		Soil							
Units :	ug/Kg		ug/Kg							
Date Sampled :	6/2/2004									
Time Sampled :	11:30									
%Moisture :	26		N/A							
pH :	6.8									
Dilution Factor :	1.0		1.0							
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	100	J	330	U						
PHENOL	440	U	330	U						
BIS-(2-CHLOROETHYL)ETHER	440	U	330	U						
2-CHLOROPHENOL	440	U	330	U						
2-METHYLPHENOL	440	U	330	U						
2,2'-OXYBIS(1- CHLOROPROPANE)	440	U	330	U						
ACETOPHENONE	440	U	330	U						
4-METHYLPHENOL	440	U	330	U						
N-NITROSO-DI-N PROPYLAMINE	440	U	330	U						
HEXACHLOROETHANE	440	U	330	U						
NITROBENZENE	440	U	330	U						
ISOPHORONE	440	U	330	U						
2-NITROPHENOL	440	U	330	U						
2,4-DIMETHYLPHENOL	440	U	330	U						
BIS(2-CHLOROETHOXY)METHANE	440	U	330	U						
2,4-DICHLOROPHENOL	440	U	330	U						
NAPHTHALENE	440	U	330	U						
4-CHLOROANILINE	440	U	330	U						
HEXACHLOROBUTADIENE	440	U	330	U						
CAPROLACTAM	440	U	330	U						
4-CHLORO-3-METHYLPHENOL	440	U	330	U						
2-METHYLNAPHTHALENE	440	U	330	U						
HEXACHLOROCYCLO-PENTADIEN	440	U	330	U						
2,4,6-TRICHLOROPHENOL	440	U	330	U						
2,4,5-TRICHLOROPHENOL	1100	U	830	U						
1,1'-BIPHENYL	440	U	330	U						
2-CHLORONAPHTHALENE	440	U	330	U						
2-NITROANILINE	1100	U	830	U						
DIMETHYLPHTHALATE	440	U	330	U						
2,6-DINITROTOLUENE	440	U	330	U						
ACENAPHTHYLENE	440	U	330	U						
3-NITROANILINE	1100	U	830	U						
ACENAPHTHENE	440	U	330	U						

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1288		SBLKKU							
Sampling Location :	SO-09									
Matrix :	Soil		Soil							
Units :	ug/Kg		ug/Kg							
Date Sampled :	6/2/2004									
Time Sampled :	11:30									
%Moisture :	26		N/A							
pH :	6.8									
Dilution Factor :	1.0		1.0							
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	1100	U	830	UJ						
4-NITROPHENOL	1100	U	830	UJ						
DIBENZOFURAN	440	U	330	U						
2,4-DINITROTOLUENE	440	U	330	U						
DIETHYLPHTHALATE	51	J	330	U						
FLUORENE	440	U	330	U						
4-CHLOROPHENYL-PHENYL ETHE	440	U	330	U						
4-NITROANILINE	1100	U	830	U						
4,6-DINITRO-2-METHYLPHENOL	1100	U	830	UJ						
N-NITROSO DIPHENYLAMINE	440	U	330	U						
4-BROMOPHENYL-PHENYLETHER	440	U	330	U						
HEXACHLOROBENZENE	440	U	330	U						
ATRAZINE	440	UJ	330	U						
PENTACHLOROPHENOL	1100	U	830	U						
PHENANTHRENE	140	J	330	U						
ANTHRACENE	440	U	330	U						
CARBAZOLE	440	U	330	U						
DI-N-BUTYLPHTHALATE	440	U	330	U						
FLUORANTHENE	160	J	330	U						
PYRENE	190	J	330	U						
BUTYLBENZYLPHTHALATE	440	U	330	U						
3,3'-DICHLOROBENZIDINE	440	U	330	U						
BENZO(A)ANTHRACENE	84	J	330	U						
CHRYSENE	110	J	330	U						
BIS(2-ETHYLHEXYL)PHTHALATE	440	U	330	U						
DI-N-OCTYLPHTHALATE	440	U	330	U						
BENZO(B)FLUORANTHENE	94	J	330	U						
BENZO(K)FLUORANTHENE	120	J	330	U						
BENZO(A)PYRENE	91	J	330	U						
INDENO(1,2,3-CD)-PYRENE	70	J	330	U						
DIBENZO(A,H)-ANTHRACENE	440	U	330	U						
BENZO(G,H,I)PERYLENE	89	J	330	U						

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Number of Soil Samples : 10
Number of Water Samples : 0

Sample Number :	E1269		E1280		E1280MS		E1280MSD		E1281	
Sampling Location :	GP-SO-10		GP-SO-01		GP-SO-01		GP-SO-01		GP-SO-02	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	17:45		15:30		15:30		15:30		16:24	
%Moisture :	17		20		20		20		36	
pH :	7.8		7.8		7.8		7.8		8.1	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	2.0	U	2.1	U	2.1	UJ	2.1	UJ	2.6	U
BETA-BHC	4.3		2.1	U	2.1	UJ	2.1	UJ	10	
DELTA-BHC	2.0	U	2.1	U	2.1	UJ	2.1	UJ	2.6	U
GAMMA-BHC (LINDANE)	2.0	U	2.1	UJ	4.1	J	3.7	J	2.6	U
HEPTACHLOR	2.0	U	2.1	UJ	5.9	J	3.6	J	2.6	U
ALDRIN	2.0	U	2.1	U	8.4	J	8.0	J	2.6	U
HEPTACHLOR EPOXIDE	4.7		2.8		2.1	J	2.1	UJ	7.3	
ENDOSU1FAN I	2.0	U	2.1	U	2.1	UJ	2.1	UJ	2.6	U
DIELDRIN	4.0	U	4.1	U	4.1	UJ	4.1	UJ	5.1	U
4,4'-DDE	4.3		14		8.5	J	41	J	10	
ENDRIN	4.0	U	4.1	UJ	8.9	J	6.0	J	5.1	U
ENDOSULFAN II	4.0	U	4.1	U	4.1	UJ	4.1	UJ	5.1	U
4,4'-DDD	34		12		8.9	J	44	J	31	
ENDOSULFAN SULFATE	4.0	U	4.1	U	4.1	UJ	4.1	UJ	5.1	U
4,4'-DDT	6.7		4.1	U	11	J	13	J	8.7	
METHOXYCHLOR	20	U	21	U	21	UJ	21	UJ	26	U
ENDRIN KETONE	4.0	U	4.1	U	4.1	UJ	4.1	UJ	6.1	
ENDRIN ALDEHYDE	4.0	U	4.1	U	4.1	UJ	4.1	UJ	5.1	U
ALPHA-CHLORDANE	2.0	U	2.1	U	2.1	UJ	2.1	UJ	2.6	U
GAMMA-CHLORDANE	12		2.1	U	2.1	UJ	2.1	UJ	17	
TOXAPHENE	200	U	210	U	210	UJ	210	UJ	260	U
AROCLOR-1016	40	U	41	U	41	UJ	41	UJ	51	U
AROCLOR-1221	81	U	83	U	83	UJ	83	UJ	100	U
AROCLOR-1232	40	U	41	U	41	UJ	41	UJ	51	U
AROCLOR-1242	40	U	41	U	41	UJ	41	UJ	51	U
AROCLOR-1248	40	U	41	U	41	UJ	41	UJ	51	U
AROCLOR-1254	210		170		140		160		630	
AROCLOR-1260	40	U	41	U	41	UJ	41	UJ	51	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1281DL		E1282		E1282DL		E1283		E1283DL	
Sampling Location :	GP-SO-02		GP-SO-03		GP-SO-03		SO-04		SO-04	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/3/2004		6/3/2004	
Time Sampled :	16:24		17:15		17:15		15:35		15:35	
%Moisture :	36		43		43		32		32	
pH :	8.1		8.3		8.3		6.6		6.6	
Dilution Factor :	10.0		1.0		10.0		1.0		10.0	
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	26	U	3.0	U	30	U	2.5	U	25	U
BETA-BHC	26	U	3.0	U	30	U	2.5	U	25	U
DELTA-BHC	26	U	3.0	U	30	U	2.5	U	25	U
GAMMA-BHC (LINDANE)	26	U	3.0	U	30	U	2.5	U	25	U
HEPTACHLOR	26	U	4.0		30	U	3.5	J	25	U
ALDRIN	26	U	3.0	U	30	U	2.5	U	25	U
HEPTACHLOR EPOXIDE	26	U	3.0		30	U	12	J	25	U
ENDOSU1FAN I	26	U	3.0	U	30	U	2.5	U	25	U
DIELDRIN	51	U	24		57	U	4.8	U	48	U
4,4'-DDE	51	U	5.7	U	57	U	6.8	J	48	U
ENDRIN	51	U	5.7	U	57	U	8.6	J	48	U
ENDOSULFAN II	51	U	5.7	U	57	U	4.8	U	48	U
4,4'-DDD	51	U	27		57	U	4.8	U	48	U
ENDOSULFAN SULFATE	51	U	5.7	U	57	U	4.8	U	48	U
4,4'-DDT	51	U	5.7	U	57	U	37	J	48	U
METHOXYCHLOR	260	U	30	U	300	U	25	U	250	U
ENDRIN KETONE	51	U	5.7	U	57	U	5.7	J	48	U
ENDRIN ALDEHYDE	51	U	5.7	U	57	U	18	J	48	U
ALPHA-CHLORDANE	26	U	6.6		30	U	2.5	U	25	U
GAMMA-CHLORDANE	27		16		34		32	J	45	J
TOXAPHENE	2600	U	300	U	3000	U	250	U	2500	U
AROCLOR-1016	510	U	57	U	570	U	48	U	480	U
AROCLOR-1221	1000	U	120	U	1200	U	98	U	980	U
AROCLOR-1232	510	U	57	U	570	U	48	U	480	U
AROCLOR-1242	510	U	57	U	570	U	48	U	480	U
AROCLOR-1248	510	U	57	U	570	U	48	U	480	U
AROCLOR-1254	1000		170		260		1100		1700	
AROCLOR-1260	510	U	57	U	570	U	48	U	480	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1284		E1285		E1285DL		E1286		E1286DL	
Sampling Location :	SO-05		SO-06		SO-06		SO-07		SO-07	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	11:45		12:10		12:10		12:15		12:15	
%Moisture :	18		27		27		23		23	
pH :	7.8		7.2		7.2		7.3		7.3	
Dilution Factor :	1.0		1.0		10.0		1.0		10.0	
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	2.0	U	2.3	U	23	U	2.2	U	22	U
BETA-BHC	2.0	U	2.3	U	23	U	2.2	U	22	U
DELTA-BHC	2.0	U	2.3	U	23	U	2.2	U	22	U
GAMMA-BHC (LINDANE)	2.0	U	2.3	U	23	U	2.2	U	22	U
HEPTACHLOR	2.0	U	2.3	U	23	U	2.2	U	22	U
ALDRIN	2.0	U	2.3	U	23	U	2.2	U	22	U
HEPTACHLOR EPOXIDE	2.0	U	7.6	J	23	U	6.9	J	22	U
ENDOSU1FAN I	2.0	U	2.3	U	23	U	2.2	U	22	U
DIELDRIN	4.0	U	4.5	U	45	U	4.3	U	43	U
4,4'-DDE	4.0	U	6.7	J	45	U	4.3	U	43	U
ENDRIN	4.0	U	4.8	J	45	U	6.2	J	43	U
ENDOSULFAN II	4.0	U	4.5	U	45	U	4.3	U	43	U
4,4'-DDD	4.0	U	18	J	45	U	4.3	U	43	U
ENDOSULFAN SULFATE	4.0	U	4.5	U	45	U	4.3	U	43	U
4,4'-DDT	4.4	J	100	J	150	J	11	J	43	U
METHOXYCHLOR	20	U	27	J	230	U	35	J	220	U
ENDRIN KETONE	6.6	J	12	J	45	U	8.0	J	43	U
ENDRIN ALDEHYDE	6.0	J	28	J	45	U	19	J	43	U
ALPHA-CHLORDANE	4.2	J	2.3	U	23	U	2.2	U	22	U
GAMMA-CHLORDANE	12	J	30	J	50	J	33	J	53	J
TOXAPHENE	200	U	230	U	2300	U	220	U	2200	U
AROCLOR-1016	40	U	45	U	450	U	43	U	430	U
AROCLOR-1221	81	U	92	U	920	U	87	U	870	U
AROCLOR-1232	40	U	45	U	450	U	43	U	430	U
AROCLOR-1242	40	U	45	U	450	U	43	U	430	U
AROCLOR-1248	40	U	45	U	450	U	43	U	430	U
AROCLOR-1254	170		850		1400		890		1500	
AROCLOR-1260	40	U	45	U	450	U	43	U	430	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1269
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1287		E1287DL		E1288		PBLK01			
Sampling Location :	SO-08		SO-08		SO-09					
Matrix :	Soil		Soil		Soil		Soil			
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg			
Date Sampled :	6/2/2004		6/2/2004		6/2/2004					
Time Sampled :	15:55		15:55		11:30					
%Moisture :	46		46		26		N/A			
pH :	7.0		7.0		6.8					
Dilution Factor :	1.0		10.0		1.0		1.0			
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	3.1	U	31	U	2.3	U	1.7	U		
BETA-BHC	3.1	U	31	U	2.3	U	1.7	U		
DELTA-BHC	3.1	U	31	U	2.3	U	1.7	U		
GAMMA-BHC (LINDANE)	3.1	U	31	U	2.3	U	1.7	U		
HEPTACHLOR	3.1	U	31	U	2.3	U	1.7	U		
ALDRIN	3.1	U	31	U	2.3	U	1.7	U		
HEPTACHLOR EPOXIDE	3.1	U	31	U	2.3	U	1.7	U		
ENDOSU1FAN I	43	J	31	U	2.3	U	1.7	U		
DIELDRIN	23	J	60	U	4.4	U	3.3	U		
4,4'-DDE	6.0	U	60	U	4.4	U	3.3	U		
ENDRIN	6.0	U	60	U	4.4	U	3.3	U		
ENDOSULFAN II	6.0	U	60	U	4.4	U	3.3	U		
4,4'-DDD	45	J	60	U	4.4	U	3.3	U		
ENDOSULFAN SULFATE	6.0	U	60	U	4.4	U	3.3	U		
4,4'-DDT	6.9	J	60	U	4.4	U	3.3	U		
METHOXYCHLOR	31	U	310	U	23	U	17	U		
ENDRIN KETONE	6.0	U	60	U	4.4	U	3.3	U		
ENDRIN ALDEHYDE	6.6	J	60	U	4.4	U	3.3	U		
ALPHA-CHLORDANE	40	J	47	J	2.3	U	1.7	U		
GAMMA-CHLORDANE	30	J	42	J	2.3	U	1.7	U		
TOXAPHENE	310	U	3100	U	230	U	170	U		
AROCLOR-1016	60	U	600	U	44	U	33	U		
AROCLOR-1221	120	U	1200	U	89	U	67	U		
AROCLOR-1232	60	U	600	U	44	U	33	U		
AROCLOR-1242	60	U	600	U	44	U	33	U		
AROCLOR-1248	60	U	600	U	44	U	33	U		
AROCLOR-1254	110		180		44	U	33	U		
AROCLOR-1260	60	U	600	U	44	U	33	U		

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Analytical Results (Qualified Data)

Case #: 32948 SDG : ME1264
Site : BUCYRUS CITY DUMP
Lab. : CHEM
Reviewer :
Date :

Number of Soil Samples : 10
Number of Water Samples : 2

Sample Number :	ME1269		ME1280		ME1281		ME1282		ME1283	
Sampling Location :	GP-SO-10		GP-SO-01		GP-SO-02		GP-SO-03		SO-04	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/3/2004	
Time Sampled :	17:45		15:30		16:24		17:15		15:35	
%Solids :	85.6		82.2		60.1		83.6		63.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	5500		4980		12700		6120		9850	
ANTIMONY	56.3		8.8		408		34.3		108	
ARSENIC	15.6		7.8		16.7		10.8		21.7	
BARIUM	95.9		97.3		282		68.9		162	
BERYLLIUM	1.4		0.43	J	0.42	J	0.38	J	0.46	J
CADMIUM	1.5		1.9		19.4		3.3		4.9	
CALCIUM	24800		30000		37400		33800		16100	
CHROMIUM	21.2	J	24.0	J	54.7	J	16.7	J	38.6	J
COBALT	9.9		5.2	J	11.2		8.1		8.1	
COPPER	157		77.1		158		47.5		97.8	
IRON	22300		15200		50600		17800		27000	
LEAD	208	R	370	R	2470	R	71.1	R	472	R
MAGNESIUM	9630		7990		7070		8150		4350	
MANGANESE	634		207		479		289		459	
MERCURY	5.2	J+	0.45	J+	15.9	J+	2.3	J+	0.63	J+
NICKEL	29.5		20.5		70.9		20.8		37.2	
POTASSIUM	1140	J	564	UJ	908	J	1360	J	1100	J
SELENIUM	4.0	U	0.56	UJ	0.97	UJ	4.2	U	0.94	UJ
SILVER	1.1	U	1.2	U	0.61	J	0.46	J	1.7	
SODIUM	635		194	J	728	J	518	J	237	J
THALLIUM	2.9	U	3.0	U	1.3	UJ	3.0	U	3.9	U
VANADIUM	16.8		13.2		17.3		15.7		19.0	
ZINC	429		1400		4580		202		1720	
CYANIDE	2.9	U	3.0	U	20.5		0.34	J	0.38	J

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Analytical Results (Qualified Data)

Case #: 32948 SDG : ME1264
Site : BUCYRUS CITY DUMP
Lab. : CHEM
Reviewer :
Date :

Sample Number :	ME1284		ME1285		ME1286		ME1287		ME1288	
Sampling Location :	SO-05		SO-06		SO-07		SO-08		SO-09	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	11:45		12:10		12:15		15:55		11:30	
%Solids :	85.4		75.9		76.0		66.3		72.1	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7360		10800		8970		8270		7670	
ANTIMONY	5.2	J	20.4		18.1		17.3		2.9	J
ARSENIC	9.7		15.5		13.6		16.4		10.1	
BARIUM	94.4		205		201		127		121	
BERYLLIUM	0.41	J	0.51	J	0.45	J	0.42	J	0.54	J
CADMIUM	1.2		4.4		3.6		4.9		1.4	
CALCIUM	55500		25500		72400		74300		4020	
CHROMIUM	19.2	J	52.4	J	35.6	J	20.8	J	14.3	J
COBALT	5.7		10.6		8.7		9.1		11.3	
COPPER	91.8		120		107		81.8		31.8	
IRON	17200		35300		26000		25800		19200	
LEAD	63.2	R	627	R	615	R	138	R	90.8	R
MAGNESIUM	14800		8360		8810		35400		1870	
MANGANESE	267		485		495		436		1420	
MERCURY	1.1	J+	1.4	J+	1.8	J+	5.0	J+	0.39	J+
NICKEL	20.5		33.2		24.2		30.1		14.1	
POTASSIUM	1150	J	1540	J	1610	J	1740	J	836	J
SELENIUM	4.0	U	0.75	UJ	4.6	U	5.2	U	0.84	UJ
SILVER	0.68	J	3.4		2.9		2.0		0.89	J
SODIUM	106	J	151	J	153	J	191	J	79.3	J
THALLIUM	2.9	U	0.79	UJ	3.3	U	3.7	U	1.1	UJ
VANADIUM	16.8		20.4		17.3		16.3		21.2	
ZINC	154		625		437		291		105	
CYANIDE	2.9	U	3.3	U	0.33	J	0.71	J	0.24	J

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Analytical Results (Qualified Data)

Case #: 32948 SDG : ME1264
Site : BUCYRUS CITY DUMP
Lab. : CHEM
Reviewer :
Date :

Sample Number :	ME1288D		ME1288S							
Sampling Location :	SO-09		SO-09							
Matrix :	Soil		Soil							
Units :	mg/Kg		mg/Kg							
Date Sampled :	6/2/2004		6/2/2004							
Time Sampled :	11:30		11:30							
%Solids :	72.5		72.1							
Dilution Factor :	1.0		1.0							
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7480									
ANTIMONY	2.9	J	27.6							
ARSENIC	11.0		21.7							
BARIUM	111		713							
BERYLLIUM	0.56	J	13.6							
CADMIUM	1.4		15.2							
CALCIUM	3990									
CHROMIUM	21.2		75.9							
COBALT	12.5		148							
COPPER	31.5		101							
IRON	20200									
LEAD	93.4		101							
MAGNESIUM	1830									
MANGANESE	1220		1700							
MERCURY	0.50		1.3							
NICKEL	15.1		152							
POTASSIUM	773									
SELENIUM	0.79	J	12.9							
SILVER	0.82	J	14.4							
SODIUM	76.8	J								
THALLIUM	3.5	U	13.5							
VANADIUM	22.2		160							
ZINC	106		249							
CYANIDE	0.24	J	7.4							

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Analytical Results (Qualified Data)

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1276
BUCYRUS CITY DUMP
CEIMIC

Number of Soil Samples : 7
Number of Water Samples : 0

Sample Number :	E1276		E1276MS		E1276MSD		E1277		E1278	
Sampling Location :	SED-1		SED-1		SED-1		SED-2		SED-3	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		10:00		10:30	
%Moisture :	48		48		48		45		35	
pH :	7.0		7.0		7.0		7.0		7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	21	U	21	U	21	U	19	U	17	U
CHLOROMETHANE	21	U	21	U	21	U	19	U	17	U
VINYL CHLORIDE	21	U	21	U	21	U	19	U	17	U
BROMOMETHANE	21	U	21	U	21	U	19	U	17	U
CHLOROETHANE	21	U	21	U	21	U	19	U	17	U
TRICHLOROFLUOROMETHANE	21	U	21	U	21	U	19	U	17	U
1,1-DICHLOROETHENE	21	U	66		60		19	U	17	U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	21	UJ	21	UJ	21	UJ	19	UJ	17	UJ
ACETONE	68		74		110		50		12	J
CARBON DISULFIDE	21	U	21	U	21	U	19	U	17	U
METHYL ACETATE	21	U	21	U	21	U	19	U	17	U
METHYLENE CHLORIDE	60	UJ	56	UJ	55	UJ	44	UJ	41	UJ
TRANS-1,2-DICHLOROETHENE	21	U	21	U	21	U	19	U	17	U
METHYL TERT-BUTYL ETHER	21	U	21	U	21	U	19	U	17	U
1,1-DICHLOROETHANE	21	U	21	U	21	U	19	U	17	U
CIS-1,2-DICHLOROETHENE	21	U	21	U	21	U	19	U	17	U
2-BUTANONE	21	U	11	J	14	J	19	U	17	U
CHLOROFORM	21	U	21	U	21	U	19	U	17	U
1,1,1-TRICHLOROETHANE	21	U	21	U	21	U	19	U	17	U
CYCLOHEXANE	21	U	21	U	21	U	19	U	17	U
CARBON TETRACHLORIDE	21	U	21	U	21	U	19	U	17	U
BENZENE	21	U	74		72		19	U	17	U
1,2-DICHLOROETHANE	21	U	21	U	21	U	19	U	17	U
TRICHLOROETHENE	21	U	68		65		19	U	17	U
METHYLCYCLOHEXANE	21	U	21	U	21	U	19	U	17	U
1,2-DICHLOROPROPANE	21	U	21	U	21	U	19	U	17	U
BROMODICHLOROMETHANE	21	U	21	U	21	U	19	U	17	U
CIS-1,3-DICHLOROPROPENE	21	U	21	U	21	U	19	U	17	U
4-METHYL-2-PENTANONE	21	U	21	U	21	U	19	U	17	U
TOLUENE	21	U	67		63		19	U	17	U
TRANS-1,3-DICHLOROPROPENE	21	U	21	U	21	U	19	U	17	U
1,1,2-TRICHLOROETHANE	21	U	21	U	21	U	19	U	17	U
TETRACHLOROETHENE	21	U	21	U	21	U	19	U	17	U

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Case #: 33011 SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1276		E1276MS		E1276MSD		E1277		E1278	
Sampling Location :	SED-1		SED-1		SED-1		SED-2		SED-3	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		10:00		10:30	
%Moisture :	48		48		48		45		35	
pH :	7.0		7.0		7.0		7.0		7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	21	U	21	U	21	U	19	U	17	U
DIBROMOCHLOROMETHANE	21	U	21	U	21	U	19	U	17	U
1,2-DIBROMOETHANE	21	U	21	U	21	U	19	U	17	U
CHLOROBENZENE	21	UJ	63		59		19	U	17	U
ETHYLBENZENE	21	U	21	U	21	U	19	U	17	U
XYLENES (TOTAL)	21	U	21	U	21	U	19	U	17	U
STYRENE	21	U	21	U	21	U	19	U	17	U
BROMOFORM	21	U	21	U	21	U	19	U	17	U
ISOPROPYLBENZENE	21	U	21	U	21	U	19	U	17	U
1,1,2,2-TETRACHLOROETHANE	21	U	21	U	21	U	19	U	17	U
1,3-DICHLOROBENZENE	21	U	21	U	21	U	19	U	17	U
1,4-DICHLOROBENZENE	21	U	21	U	21	U	19	U	17	U
1,2-DICHLOROBENZENE	21	U	21	U	21	U	19	U	17	U
1,2-DIBROMO-3-CHLOROPROPANE	21	U	21	U	21	U	19	U	17	U
1,2,4-TRICHLOROBENZENE	21	U	21	U	21	U	19	U	17	U

Analytical Results (Qualified Data)

Case #: 33011 SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1279		E1329		E1330		E1330MS		E1330MSD	
Sampling Location :	SED-4		SED-5		SED-6		SED-6		SED-6	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	11:00		11:35		11:30		11:30		11:30	
%Moisture :	44		34		43		43		43	
pH :	7.0		7.0		7.0		7.0		7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	18	U	38	U	2300	U	2300	U	2300	U
CHLOROMETHANE	18	U	38	U	2300	U	2300	U	2300	U
VINYL CHLORIDE	18	U	38	U	2300	U	2300	U	2300	U
BROMOMETHANE	18	U	38	U	2300	U	2300	U	2300	U
CHLOROETHANE	18	U	38	U	2300	U	2300	U	2300	U
TRICHLOROFLUOROMETHANE	18	U	38	U	2300	U	2300	U	2300	U
1,1-DICHLOROETHENE	18	U	38	U	2300	UJ	5300	VS	5200	VS
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	18	UJ	38	U	2300	U	2300	U	2300	U
ACETONE	44		37	J	2300	VS	2300	VS	2300	VS
CARBON DISULFIDE	18	U	38	U	2300	U	2300	U	2300	U
METHYL ACETATE	18	U	38	U	2300	VS	2300	VS	2300	VS
METHYLENE CHLORIDE	45	UJ	45	UJ	2300	VS	2300	VS	2300	VS
TRANS-1,2-DICHLOROETHENE	18	U	38	U	2300	U	2300	U	2300	U
METHYL TERT-BUTYL ETHER	18	U	38	U	2300	U	2300	U	2300	U
1,1-DICHLOROETHANE	18	U	38	U	2300	U	2300	U	2300	U
CIS-1,2-DICHLOROETHENE	18	U	38	U	2300	U	2300	U	2300	U
2-BUTANONE	18	U	38	UJ	2300	U	2300	U	2300	U
CHLOROFORM	18	U	38	U	2300	U	2300	U	2300	U
1,1,1-TRICHLOROETHANE	18	U	38	U	2300	U	2300	U	2300	U
CYCLOHEXANE	18	U	38	U	2300	U	2300	U	2300	U
CARBON TETRACHLORIDE	18	U	38	U	2300	U	2300	U	2300	U
BENZENE	18	U	38	U	2300	U	9400	VS	9500	VS
1,2-DICHLOROETHANE	18	U	38	U	2300	U	2300	U	2300	U
TRICHLOROETHENE	18	U	38	U	2300	U	10000	VS	10000	VS
METHYLCYCLOHEXANE	18	U	38	U	2300	U	2300	U	2300	U
1,2-DICHLOROPROPANE	18	U	38	U	2300	U	2300	U	2300	U
BROMODICHLOROMETHANE	18	U	38	U	2300	U	2300	U	2300	U
CIS-1,3-DICHLOROPROPENE	18	U	38	U	2300	U	2300	U	2300	U
4-METHYL-2-PENTANONE	18	U	38	UJ	2300	U	2300	U	2300	U
TOLUENE	18	U	540		11000	VS	21000	VS	22000	VS
TRANS-1,3-DICHLOROPROPENE	18	U	38	U	2300	U	2300	U	2300	U
1,1,2-TRICHLOROETHANE	18	U	38	U	2300	U	2300	U	2300	U
TETRACHLOROETHENE	18	U	38	U	2300	U	2300	U	2300	U

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Analytical Results (Qualified Data)

Case #: 33011
SDG : E1276

Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1279		E1329		E1330		E1330MS		E1330MSD	
Sampling Location :	SED-4		SED-5		SED-6		SED-6		SED-6	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	11:00		11:35		11:30		11:30		11:30	
%Moisture :	44		34		43		43		43	
pH :	7.0		7.0		7.0		7.0		7.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	18	U	38	UJ	2300	U	2300	U	2300	U
DIBROMOCHLOROMETHANE	18	U	38	U	2300	U	2300	U	2300	U
1,2-DIBROMOETHANE	18	U	38	U	2300	U	2300	U	2300	U
CHLOROBENZENE	18	U	38	U	2300	U	10000	VS	11000	VS
ETHYLBENZENE	18	U	38	U	2300	U	2300	U	2300	U
XYLENES (TOTAL)	18	U	38	U	2300	U	2300	U	2300	U
STYRENE	18	U	38	U	2300	U	2300	U	2300	U
BROMOFORM	18	U	38	U	2300	U	2300	U	2300	U
ISOPROPYLBENZENE	18	U	38	U	2300	U	2300	U	2300	U
1,1,2,2-TETRACHLOROETHANE	18	U	38	U	2300	U	2300	U	2300	U
1,3-DICHLOROBENZENE	18	U	38	U	2300	U	2300	U	2300	U
1,4-DICHLOROBENZENE	18	U	38	U	29	VS	34	VS	2300	U
1,2-DICHLOROBENZENE	18	U	38	U	2300	U	2300	U	2300	U
1,2-DIBROMO-3-CHLOROPROPANE	18	U	38	R	2300	U	2300	U	2300	U
1,2,4-TRICHLOROBENZENE	18	U	38	U	2300	U	2300	U	2300	U

Analytical Results (Qualified Data)

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1276
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1331		VBLKLT		VBLKOA		VBLKOB			
Sampling Location :	SED-7									
Matrix :	Soil		Soil		Soil		Soil			
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg			
Date Sampled :	6/22/2004									
Time Sampled :	12:40									
%Moisture :	41		N/A		N/A		N/A			
pH :	7.0									
Dilution Factor :	1.0		1.0		1.0		1.0			
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	19	U	1300	U	6	J	4	J		
CHLOROMETHANE	19	U	1300	U	10	U	10	U		
VINYL CHLORIDE	19	U	1300	U	10	U	10	U		
BROMOMETHANE	19	U	1300	U	10	U	10	U		
CHLOROETHANE	19	U	1300	U	10	U	10	U		
TRICHLOROFLUOROMETHANE	19	U	1300	U	10	U	10	U		
1,1-DICHLOROETHENE	19	U	1300	U	10	U	10	U		
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	19	UJ	1300	U	10	UJ	10	U		
ACETONE	23		1600		10	U	10	U		
CARBON DISULFIDE	19	U	1300	U	10	U	10	U		
METHYL ACETATE	19	U	330	J	10	U	10	U		
METHYLENE CHLORIDE	41	UJ	130	J	7	J	12	J		
TRANS-1,2-DICHLOROETHENE	19	U	1300	U	10	U	10	U		
METHYL TERT-BUTYL ETHER	19	U	1300	U	10	U	10	U		
1,1-DICHLOROETHANE	19	U	1300	U	10	U	10	U		
CIS-1,2-DICHLOROETHENE	19	U	1300	U	10	U	10	U		
2-BUTANONE	19	U	1300	U	10	U	10	UJ		
CHLOROFORM	19	U	1300	U	10	U	10	U		
1,1,1-TRICHLOROETHANE	19	U	1300	U	10	U	10	U		
CYCLOHEXANE	19	U	1300	U	10	U	10	U		
CARBON TETRACHLORIDE	19	U	1300	U	10	U	10	U		
BENZENE	19	U	1300	U	10	U	10	U		
1,2-DICHLOROETHANE	19	U	1300	U	10	U	10	U		
TRICHLOROETHENE	19	U	1300	U	10	U	10	U		
METHYLCYCLOHEXANE	19	U	1300	U	10	U	10	U		
1,2-DICHLOROPROPANE	19	U	1300	U	10	U	10	U		
BROMODICHLOROMETHANE	19	U	1300	U	10	U	10	U		
CIS-1,3-DICHLOROPROPENE	19	U	1300	U	10	U	10	U		
4-METHYL-2-PENTANONE	19	U	1300	U	10	U	10	UJ		
TOLUENE	19	U	1300	U	10	U	10	U		
TRANS-1,3-DICHLOROPROPENE	19	U	1300	U	10	U	10	U		
1,1,2-TRICHLOROETHANE	19	U	1300	U	10	U	10	U		
TETRACHLOROETHENE	19	U	1300	U	10	U	10	U		

Analytical Results (Qualified Data)

Case #: 33011 SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1331		VBLKLT		VBLKOA		VBLKOB			
Sampling Location :	SED-7									
Matrix :	Soil		Soil		Soil		Soil			
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg			
Date Sampled :	6/22/2004									
Time Sampled :	12:40									
%Moisture :	41		N/A		N/A		N/A			
pH :	7.0									
Dilution Factor :	1.0		1.0		1.0		1.0			
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	19	U	1300	U	10	U	10	UJ		
DIBROMOCHLOROMETHANE	19	U	1300	U	10	U	10	U		
1,2-DIBROMOETHANE	19	U	1300	U	10	U	10	U		
CHLOROBENZENE	19	U	1300	U	10	U	10	U		
ETHYLBENZENE	19	U	1300	U	10	U	10	U		
XYLENES (TOTAL)	19	U	1300	U	10	U	10	U		
STYRENE	19	U	1300	U	10	U	10	U		
BROMOFORM	19	U	1300	U	10	U	10	U		
ISOPROPYLBENZENE	19	U	1300	U	10	U	10	U		
1,1,2,2-TETRACHLOROETHANE	19	U	1300	U	10	U	10	U		
1,3-DICHLOROBENZENE	19	U	1300	U	10	U	10	U		
1,4-DICHLOROBENZENE	19	U	1300	U	10	U	10	U		
1,2-DICHLOROBENZENE	19	U	1300	U	10	U	10	U		
1,2-DIBROMO-3-CHLOROPROPANE	19	U	1300	U	10	U	10	R		
1,2,4-TRICHLOROBENZENE	19	U	1300	U	10	U	10	U		

Analytical Results (Qualified Data)

Case #: 33011
SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	VBLKLS		VHBLK01							
Sampling Location :										
Matrix :	Water		Water							
Units :	ug/L		ug/L							
Date Sampled :										
Time Sampled :										
%Moisture :	N/A		N/A							
pH :										
Dilution Factor :	1.0		1.0							
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	10	U	10	U						
CHLOROMETHANE	10	U	10	U						
VINYL CHLORIDE	10	U	10	U						
BROMOMETHANE	10	U	10	U						
CHLOROETHANE	10	U	10	U						
TRICHLOROFLUOROMETHANE	10	U	10	U						
1,1-DICHLOROETHENE	10	U	10	U						
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	10	U	10	U						
ACETONE	10	U	10	U						
CARBON DISULFIDE	10	U	10	U						
METHYL ACETATE	10	U	10	U						
METHYLENE CHLORIDE	10	U	10	U						
TRANS-1,2-DICHLOROETHENE	10	U	10	U						
METHYL TERT-BUTYL ETHER	10	U	10	U						
1,1-DICHLOROETHANE	10	U	10	U						
CIS-1,2-DICHLOROETHENE	10	U	10	U						
2-BUTANONE	10	U	10	U						
CHLOROFORM	10	U	10	U						
1,1,1-TRICHLOROETHANE	10	U	10	U						
CYCLOHEXANE	10	U	10	U						
CARBON TETRACHLORIDE	10	U	10	U						
BENZENE	10	U	10	U						
1,2-DICHLOROETHANE	10	U	10	U						
TRICHLOROETHENE	10	U	10	U						
METHYLCYCLOHEXANE	10	U	10	U						
1,2-DICHLOROPROPANE	10	U	10	U						
BROMODICHLOROMETHANE	10	U	10	U						
CIS-1,3-DICHLOROPROPENE	10	U	10	U						
4-METHYL-2-PENTANONE	10	U	10	U						
TOLUENE	10	U	10	U						
TRANS-1,3-DICHLOROPROPENE	10	U	10	U						
1,1,2-TRICHLOROETHANE	10	U	10	U						
TETRACHLOROETHENE	10	U	10	U						

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1276
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	VBLKLS		VHBLK01							
Sampling Location :										
Matrix :	Water		Water							
Units :	ug/L		ug/L							
Date Sampled :										
Time Sampled :										
%Moisture :	N/A		N/A							
pH :										
Dilution Factor :	1.0		1.0							
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	10	U	10	U						
DIBROMOCHLOROMETHANE	10	U	10	U						
1,2-DIBROMOETHANE	10	U	10	U						
CHLOROBENZENE	10	U	10	U						
ETHYLBENZENE	10	U	10	U						
XYLENES (TOTAL)	10	U	10	U						
STYRENE	10	U	10	U						
BROMOFORM	10	U	10	U						
ISOPROPYLBENZENE	10	U	10	U						
1,1,2,2-TETRACHLOROETHANE	10	U	10	U						
1,3-DICHLOROBENZENE	10	U	10	U						
1,4-DICHLOROBENZENE	10	U	10	U						
1,2-DICHLOROBENZENE	10	U	10	U						
1,2-DIBROMO-3-CHLOROPROPANE	10	U	10	U						
1,2,4-TRICHLOROBENZENE	10	U	10	U						

Analytical Results (Qualified Data)

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1276
BUCYRUS CITY DUMP
CEIMIC

Number of Soil Samples : 7
Number of Water Samples : 0

Sample Number :	E1276		E1276DL		E1276MS		E1276MSD		E1277	
Sampling Location :	SED-1		SED-1		SED-1		SED-1		SED-2	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		09:05		10:00	
%Moisture :	38		38		38		38		36	
pH :	7.3		7.3		7.3		7.3		7.3	
Dilution Factor :	6.0		18.0		6.0		6.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	3200	UJ	9500	UJ	3200	UJ	3200	UJ	89	J
PHENOL	3200	U	9500	U	2300	J	1700	J	510	U
BIS-(2-CHLOROETHYL)ETHER	3200	U	9500	U	3200	U	3200	U	510	U
2-CHLOROPHENOL	3200	U	9500	U	2200	J	1600	J	510	U
2-METHYLPHENOL	3200	U	9500	U	3200	U	3200	U	510	U
2,2'-OXYBIS(1- CHLOROPROPANE	3200	U	9500	U	3200	U	3200	U	510	U
ACETOPHENONE	3200	U	9500	U	3200	U	3200	U	510	U
4-METHYLPHENOL	3200	U	9500	U	3200	U	3200	U	510	U
N-NITROSO-DI-N PROPYLAMINE	3200	UJ	9500	U	1600	J	1000	J	510	U
HEXACHLOROETHANE	3200	U	9500	U	3200	U	3200	U	510	U
NITROBENZENE	3200	U	9500	U	3200	U	3200	U	510	U
ISOPHORONE	3200	U	9500	U	3200	U	3200	U	510	U
2-NITROPHENOL	3200	U	9500	U	3200	U	3200	U	510	U
2,4-DIMETHYLPHENOL	3200	U	9500	U	3200	U	3200	U	510	U
BIS(2-CHLOROETHOXY)METHANE	3200	U	9500	U	3200	U	3200	U	510	U
2,4-DICHLOROPHENOL	3200	U	9500	U	3200	U	3200	U	510	U
NAPHTHALENE	440	J	9500	U	410	J	360	J	510	U
4-CHLOROANILINE	3200	U	9500	U	3200	U	3200	U	510	U
HEXACHLOROBUTADIENE	3200	U	9500	U	3200	U	3200	U	510	U
CAPROLACTAM	3200	U	9500	U	3200	U	3200	U	510	U
4-CHLORO-3-METHYLPHENOL	3200	U	9500	U	2700	J	2000	J	510	U
2-METHYLNAPHTHALENE	390	J	9500	U	370	J	3200	U	510	U
HEXACHLOROCYCLO-PENTADIEN	3200	U	9500	U	3200	U	3200	U	510	U
2,4,6-TRICHLOROPHENOL	3200	U	9500	U	3200	U	3200	U	510	U
2,4,5-TRICHLOROPHENOL	8000	U	24000	U	8000	U	8000	U	1300	U
1,1'-BIPHENYL	3200	U	9500	U	3200	U	3200	U	510	U
2-CHLORONAPHTHALENE	3200	U	9500	U	3200	U	3200	U	510	U
2-NITROANILINE	8000	U	24000	U	8000	U	8000	U	1300	U
DIMETHYLPHTHALATE	3200	U	9500	U	3200	U	3200	U	510	U
2,6-DINITROTOLUENE	3200	U	9500	U	3200	U	3200	U	510	U
ACENAPHTHYLENE	3200	U	9500	U	3200	U	550	J	510	U
3-NITROANILINE	8000	U	24000	U	8000	U	8000	U	1300	U
ACENAPHTHENE	2300	J	2300	J	4000		3300		89	J

DISCLAIMER: This package has been electronically assessed as an added service to our customer. It has not been either validated or approved by Region 5 and any subsequent use by the data user is strictly at the risk of the data user. Region 5 assumes no responsibility for use of unvalidated data.

Analytical Results (Qualified Data)

Case #: 33011 SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1276		E1276DL		E1276MS		E1276MSD		E1277	
Sampling Location :	SED-1		SED-1		SED-1		SED-1		SED-2	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		09:05		10:00	
%Moisture :	38		38		38		38		36	
pH :	7.3		7.3		7.3		7.3		7.3	
Dilution Factor :	6.0		18.0		6.0		6.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	8000	U	24000	U	8000	U	8000	U	1300	U
4-NITROPHENOL	8000	U	24000	U	2800	J	2600	J	1300	U
DIBENZOFURAN	3200	U	9500	U	3200	U	3200	U	510	U
2,4-DINITROTOLUENE	3200	U	9500	U	2100	J	1600	J	510	U
DIETHYLPHTHALATE	3200	U	9500	U	3200	U	3200	U	510	U
FLUORENE	2600	J	2800	J	2500	J	2200	J	80	J
4-CHLOROPHENYL-PHENYL ETHE	3200	U	9500	U	3200	U	3200	U	510	U
4-NITROANILINE	8000	U	24000	U	8000	U	8000	U	1300	U
4,6-DINITRO-2-METHYLPHENOL	8000	U	24000	U	8000	U	8000	U	1300	U
N-NITROSO DIPHENYLAMINE	3200	U	9500	U	3200	U	3200	U	510	U
4-BROMOPHENYL-PHENYLETHER	3200	U	9500	U	3200	U	3200	U	510	U
HEXACHLOROBENZENE	3200	U	9500	U	3200	U	3200	U	510	U
ATRAZINE	3200	UJ	9500	UJ	3200	UJ	3200	UJ	510	UJ
PENTACHLOROPHENOL	8000	UJ	24000	U	350	J	470	J	1300	U
PHENANTHRENE	5200		5200	J	4300		3900		630	
ANTHRACENE	4600		4600	J	4300		3900		160	J
CARBAZOLE	3200	U	9500	U	3200	U	3200	U	510	U
DI-N-BUTYLPHTHALATE	3200	U	9500	U	3200	U	3200	U	510	U
FLUORANTHENE	19000		19000		19000		19000		1000	
PYRENE	45000	J	45000		46000		39000		1300	
BUTYLBENZYLPHTHALATE	3200	U	9500	U	3200	U	3200	U	89	J
3,3'-DICHLOROBENZIDINE	3200	U	9500	U	3200	U	3200	U	510	U
BENZO(A)ANTHRACENE	12000		12000		12000		11000		430	J
CHRYSENE	13000		13000		13000		12000		510	
BIS(2-ETHYLHEXYL)PHTHALATE	2800	J	3400	J	2500	J	2600	J	3600	
DI-N-OCTYLPHTHALATE	3200	U	9500	U	3200	U	3200	U	510	U
BENZO(B)FLUORANTHENE	5700		4700	J	5400		5100		410	J
BENZO(K)FLUORANTHENE	6500		7800	J	5300		5800		400	J
BENZO(A)PYRENE	11000		12000		11000		10000		460	J
INDENO(1,2,3-CD)-PYRENE	4300		4200	J	4200		3600		290	J
DIBENZO(A,H)-ANTHRACENE	2100	J	1500	J	2000	J	1600	J	97	J
BENZO(G,H,I)PERYLENE	6000		6200	J	5800		5200		370	J

Analytical Results (Qualified Data)

Case #: 33011 SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1278		E1279		E1279DL		E1329		E1330	
Sampling Location :	SED-3		SED-4		SED-4		SED-5		SED-6	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	10:30		11:00		11:00		11:35		11:30	
%Moisture :	33		40		40		49		46	
pH :	8.1		8.3		8.3		6.8		7.3	
Dilution Factor :	1.0		1.0		2.0		5.0		6.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	480	UJ	86	J	150	J	3200	UJ	3700	UJ
PHENOL	480	U	540	U	1100	U	3200	U	3700	U
BIS-(2-CHLOROETHYL)ETHER	480	U	540	U	1100	U	3200	U	3700	U
2-CHLOROPHENOL	480	U	540	U	1100	U	3200	U	3700	U
2-METHYLPHENOL	480	U	540	U	1100	U	3200	U	3700	U
2,2'-OXYBIS(1- CHLOROPROPANE	480	U	540	U	1100	U	3200	U	3700	U
ACETOPHENONE	480	U	540	U	1100	U	3200	U	3700	U
4-METHYLPHENOL	480	U	290	J	340	J	7700		8100	
N-NITROSO-DI-N PROPYLAMINE	480	U	540	U	1100	U	3200	U	3700	U
HEXACHLOROETHANE	480	U	540	U	1100	U	3200	U	3700	U
NITROBENZENE	480	U	540	U	1100	U	3200	U	3700	U
ISOPHORONE	480	U	540	U	1100	U	3200	U	3700	U
2-NITROPHENOL	480	U	540	U	1100	U	3200	U	3700	U
2,4-DIMETHYLPHENOL	480	U	540	U	1100	U	3200	U	3700	U
BIS(2-CHLOROETHOXY)METHANE	480	U	540	U	1100	U	3200	U	3700	U
2,4-DICHLOROPHENOL	480	U	540	U	1100	U	3200	U	3700	U
NAPHTHALENE	480	U	87	J	1100	U	3200	U	3700	U
4-CHLOROANILINE	480	U	540	U	1100	U	3200	U	3700	U
HEXACHLOROBUTADIENE	480	U	540	U	1100	U	3200	U	3700	U
CAPROLACTAM	480	U	540	U	1100	U	3200	U	3700	U
4-CHLORO-3-METHYLPHENOL	480	U	540	U	1100	U	3200	U	3700	U
2-METHYLNAPHTHALENE	480	U	110	J	120	J	3200	U	3700	U
HEXACHLOROCYCLO-PENTADIEN	480	U	540	U	1100	U	3200	U	3700	U
2,4,6-TRICHLOROPHENOL	480	U	540	U	1100	U	3200	U	3700	U
2,4,5-TRICHLOROPHENOL	1200	U	1400	U	2700	U	8100	U	9200	U
1,1'-BIPHENYL	480	U	540	U	1100	U	3200	U	3700	U
2-CHLORONAPHTHALENE	480	U	540	U	1100	U	3200	U	3700	U
2-NITROANILINE	1200	U	1400	U	2700	U	8100	U	9200	U
DIMETHYLPHTHALATE	480	U	540	U	1100	U	3200	U	3700	U
2,6-DINITROTOLUENE	480	U	540	U	1100	U	3200	U	3700	U
ACENAPHTHYLENE	480	U	540	U	1100	U	3200	U	3700	U
3-NITROANILINE	1200	U	1400	U	2700	U	8100	U	9200	U
ACENAPHTHENE	480	U	500	J	510	J	3200	U	3700	U

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Analytical Results (Qualified Data)

Case #: 33011 SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1278		E1279		E1279DL		E1329		E1330	
Sampling Location :	SED-3		SED-4		SED-4		SED-5		SED-6	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	10:30		11:00		11:00		11:35		11:30	
%Moisture :	33		40		40		49		46	
pH :	8.1		8.3		8.3		6.8		7.3	
Dilution Factor :	1.0		1.0		2.0		5.0		6.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	1200	U	1400	U	2700	U	8100	U	9200	U
4-NITROPHENOL	1200	U	1400	U	2700	U	8100	U	9200	U
DIBENZOFURAN	480	U	150	J	160	J	3200	U	3700	U
2,4-DINITROTOLUENE	480	U	540	U	1100	U	3200	U	3700	U
DIETHYLPHTHALATE	480	U	540	U	1100	U	3200	U	3700	U
FLUORENE	480	U	360	J	400	J	3200	U	3700	U
4-CHLOROPHENYL-PHENYL ETHE	480	U	540	U	1100	U	3200	U	3700	U
4-NITROANILINE	1200	U	1400	U	2700	U	8100	U	9200	U
4,6-DINITRO-2-METHYLPHENOL	1200	U	1400	U	2700	U	8100	U	9200	U
N-NITROSO DIPHENYLAMINE	480	U	540	U	1100	U	3200	U	3700	U
4-BROMOPHENYL-PHENYLETHER	480	U	540	U	1100	U	3200	U	3700	U
HEXACHLOROBENZENE	480	U	540	U	1100	U	3200	U	3700	U
ATRAZINE	480	UJ	540	UJ	1100	UJ	3200	UJ	3700	UJ
PENTACHLOROPHENOL	1200	U	1400	U	2700	U	8100	U	9200	U
PHENANTHRENE	120	J	2700		2900		1400	J	1500	J
ANTHRACENE	480	U	700		700	J	3200	U	3700	U
CARBAZOLE	480	U	310	J	340	J	3200	U	3700	U
DI-N-BUTYLPHTHALATE	480	U	540	U	1100	U	3200	U	3700	U
FLUORANTHENE	130	J	3800		4000		2200	J	2300	J
PYRENE	180	J	4700		5000		2800	J	2500	J
BUTYLBENZYLPHTHALATE	110	J	120	J	120	J	390	J	530	J
3,3'-DICHLOROBENZIDINE	480	U	540	U	1100	U	3200	U	3700	U
BENZO(A)ANTHRACENE	60	J	1700		1800		890	J	830	J
CHRYSENE	110	J	1800		2000		1300	J	1300	J
BIS(2-ETHYLHEXYL)PHTHALATE	3000		3700		3900		21000		24000	
DI-N-OCTYLPHTHALATE	480	U	110	J	1100	U	2000	J	3700	
BENZO(B)FLUORANTHENE	81	J	1300		1600		1100	J	990	J
BENZO(K)FLUORANTHENE	72	J	1600		1600		980	J	970	J
BENZO(A)PYRENE	76	J	1600		1700		1000	J	1000	J
INDENO(1,2,3-CD)-PYRENE	480	U	990		980	J	700	J	660	J
DIBENZO(A,H)-ANTHRACENE	480	U	500	J	380	J	3200	U	3700	U
BENZO(G,H,I)PERYLENE	88	J	1200		1100		800	J	830	J

Analytical Results (Qualified Data)

Case #: 33011
SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1331		SBLKKG							
Sampling Location :	SED-7									
Matrix :	Soil		Soil							
Units :	ug/Kg		ug/Kg							
Date Sampled :	6/22/2004									
Time Sampled :	12:40									
%Moisture :	36		N/A							
pH :	7.6									
Dilution Factor :	1.0		1.0							
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	510	UJ	330	UJ						
PHENOL	510	U	330	U						
BIS-(2-CHLOROETHYL)ETHER	510	U	330	U						
2-CHLOROPHENOL	510	U	330	U						
2-METHYLPHENOL	510	U	330	U						
2,2'-OXYBIS(1- CHLOROPROPANE	510	U	330	U						
ACETOPHENONE	510	U	330	U						
4-METHYLPHENOL	510	U	330	U						
N-NITROSO-DI-N PROPYLAMINE	510	U	330	U						
HEXACHLOROETHANE	510	U	330	U						
NITROBENZENE	510	U	330	U						
ISOPHORONE	510	U	330	U						
2-NITROPHENOL	510	U	330	U						
2,4-DIMETHYLPHENOL	510	U	330	U						
BIS(2-CHLOROETHOXY)METHANE	510	U	330	U						
2,4-DICHLOROPHENOL	510	U	330	U						
NAPHTHALENE	510	U	330	U						
4-CHLOROANILINE	510	U	330	U						
HEXACHLOROBUTADIENE	510	U	330	U						
CAPROLACTAM	510	U	330	U						
4-CHLORO-3-METHYLPHENOL	510	U	330	U						
2-METHYLNAPHTHALENE	510	U	330	U						
HEXACHLOROCYCLO-PENTADIEN	510	U	330	U						
2,4,6-TRICHLOROPHENOL	510	U	330	U						
2,4,5-TRICHLOROPHENOL	1300	U	830	U						
1,1'-BIPHENYL	510	U	330	U						
2-CHLORONAPHTHALENE	510	U	330	U						
2-NITROANILINE	1300	U	830	U						
DIMETHYLPHTHALATE	510	U	330	U						
2,6-DINITROTOLUENE	510	U	330	U						
ACENAPHTHYLENE	510	U	330	U						
3-NITROANILINE	1300	U	830	U						
ACENAPHTHENE	510	U	330	U						

Analytical Results (Qualified Data)

Case #: 33011 | SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1331		SBLKKG							
Sampling Location :	SED-7									
Matrix :	Soil		Soil							
Units :	ug/Kg		ug/Kg							
Date Sampled :	6/22/2004									
Time Sampled :	12:40									
%Moisture :	36		N/A							
pH :	7.6									
Dilution Factor :	1.0		1.0							
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	1300	U	830	U						
4-NITROPHENOL	1300	U	830	U						
DIBENZOFURAN	510	U	330	U						
2,4-DINITROTOLUENE	510	U	330	U						
DIETHYLPHTHALATE	510	U	330	U						
FLUORENE	510	U	330	U						
4-CHLOROPHENYL-PHENYL ETHE	510	U	330	U						
4-NITROANILINE	1300	U	830	U						
4,6-DINITRO-2-METHYLPHENOL	1300	U	830	U						
N-NITROSO DIPHENYLAMINE	510	U	330	U						
4-BROMOPHENYL-PHENYLETHER	510	U	330	U						
HEXACHLOROBENZENE	510	U	330	U						
ATRAZINE	510	UJ	330	UJ						
PENTACHLOROPHENOL	1300	U	830	U						
PHENANTHRENE	380	J	330	U						
ANTHRACENE	510	U	330	U						
CARBAZOLE	510	U	330	U						
DI-N-BUTYLPHTHALATE	510	U	330	U						
FLUORANTHENE	620		330	U						
PYRENE	700		330	U						
BUTYLBENZYLPHTHALATE	140	J	330	U						
3,3'-DICHLOROBENZIDINE	510	U	330	U						
BENZO(A)ANTHRACENE	210	J	330	U						
CHRYSENE	340	J	330	U						
BIS(2-ETHYLHEXYL)PHTHALATE	2000		77	J						
DI-N-OCTYLPHTHALATE	510	U	330	U						
BENZO(B)FLUORANTHENE	340	J	330	U						
BENZO(K)FLUORANTHENE	220	J	330	U						
BENZO(A)PYRENE	260	J	330	U						
INDENO(1,2,3-CD)-PYRENE	190	J	330	U						
DIBENZO(A,H)-ANTHRACENE	72	J	330	U						
BENZO(G,H,I)PERYLENE	250	J	330	U						

Sample Number :	E1276		E1276MS		E1276MSD		E1277		E1278	
Sampling Location :	SED-1		SED-1		SED-1		SED-2		SED-3	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		10:00		10:30	
%Moisture :	38		38		38		36		33	
pH :	8.0		8.0		8.0		7.6		8.1	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	2.7	R	2.7	R	2.7	U	2.6	U	2.5	U
BETA-BHC	2.7	R	2.7	R	2.7	U	2.6	U	2.5	U
DELTA-BHC	2.7	R	2.7	R	2.7	U	2.6	U	2.5	U
GAMMA-BHC (LINDANE)	2.7	UJ	7.7	J	9.3		2.6	U	2.5	U
HEPTACHLOR	2.7	UJ	8.4	J	10		2.6	U	2.5	U
ALDRIN	2.7	UJ	6.4	J	7.0		2.6	U	2.5	U
HEPTACHLOR EPOXIDE	2.7	R	2.7	R	2.7	U	2.6	U	2.5	U
ENDOSU1FAN I	2.7	R	2.7	R	2.7	U	2.6	U	2.5	U
DIELDRIN	6.0	J	30	J	32		5.1	U	4.9	U
4,4'-DDE	5.3	R	5.3	R	5.9		5.1	U	4.9	U
ENDRIN	5.3	UJ	24	J	22		5.1	U	4.9	U
ENDOSULFAN II	5.3	R	5.3	R	5.3	U	5.1	U	4.9	U
4,4'-DDD	5.3	R	5.3	R	5.3	U	5.1	U	4.9	U
ENDOSULFAN SULFATE	5.3	R	5.3	R	5.3	U	5.1	U	4.9	U
4,4'-DDT	5.3	R	26	J	26		5.1	U	4.9	U
METHOXYCHLOR	27	R	27	R	27	U	26	U	25	U
ENDRIN KETONE	5.3	R	5.3	R	5.3	U	5.1	U	4.9	U
ENDRIN ALDEHYDE	5.3	R	5.3	R	5.3	U	5.1	U	4.9	U
ALPHA-CHLORDANE	2.7	R	2.7	R	2.7	U	4.7		2.5	U
GAMMA-CHLORDANE	2.7	R	2.7	R	2.7	U	5.1		2.5	U
TOXAPHENE	270	R	270	R	270	U	260	U	250	U
AROCLOR-1016	53	R	53	R	53	U	51	U	49	U
AROCLOR-1221	110	R	110	R	110	U	100	U	100	U
AROCLOR-1232	53	R	53	R	53	U	51	U	49	U
AROCLOR-1242	53	R	53	R	53	U	51	U	49	U
AROCLOR-1248	53	R	53	R	53	U	51	U	49	U
AROCLOR-1254	53	R	53	R	53	U	51	U	64	
AROCLOR-1260	53	R	53	R	53	U	51	U	49	U

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Case #: 33011 SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1279		E1279DL		E1329		E1330		E1330DL	
Sampling Location :	SED-4		SED-4		SED-5		SED-6		SED-6	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	11:00		11:00		11:35		11:30		11:30	
%Moisture :	40		40		49		46		46	
pH :	8.2		8.2		6.6		7.3		7.3	
Dilution Factor :	1.0		10.0		1.0		1.0		10.0	
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	2.8	U	28	U	3.3	U	3.1	U	31	U
BETA-BHC	7.0		28	U	3.3	U	4.8		31	U
DELTA-BHC	2.8	U	28	U	3.3	U	3.1	U	31	U
GAMMA-BHC (LINDANE)	2.8	U	28	U	3.3	U	3.1	U	31	U
HEPTACHLOR	2.8	U	28	U	3.3	U	3.1	U	31	U
ALDRIN	2.8	U	28	U	3.3	U	3.1	U	31	U
HEPTACHLOR EPOXIDE	3.3		28	U	3.3	U	3.1	U	31	U
ENDOSU1FAN I	2.8	U	28	U	3.3	U	3.1	U	31	U
DIELDRIN	5.5	U	55	U	6.4	U	6.1	U	61	U
4,4'-DDE	5.5	U	55	U	6.4	U	6.1	U	61	U
ENDRIN	5.5	U	55	U	6.4	U	6.1	U	61	U
ENDOSULFAN II	5.5	U	55	U	6.4	U	6.1	U	61	U
4,4'-DDD	17		55	U	6.4	U	6.1	U	61	U
ENDOSULFAN SULFATE	5.5	U	55	U	6.4	U	6.1	U	61	U
4,4'-DDT	5.5	U	55	U	6.4	U	6.1	U	61	U
METHOXYCHLOR	28	U	280	U	33	U	31	U	310	U
ENDRIN KETONE	5.5	U	55	U	6.4	U	6.1	U	61	U
ENDRIN ALDEHYDE	9.0		55	U	6.4	U	6.1	U	61	U
ALPHA-CHLORDANE	5.5		28	U	3.3	U	3.1	U	31	U
GAMMA-CHLORDANE	10		28	U	3.3	U	6.7		31	U
TOXAPHENE	280	U	2800	U	330	U	310	U	3100	U
AROCLOR-1016	55	U	550	U	64	U	61	U	610	U
AROCLOR-1221	110	U	1100	U	130	U	120	U	1200	U
AROCLOR-1232	55	U	550	U	64	U	61	U	610	U
AROCLOR-1242	55	U	550	U	64	U	61	U	610	U
AROCLOR-1248	55	U	550	U	64	U	61	U	610	U
AROCLOR-1254	130		170		64	U	61	U	610	U
AROCLOR-1260	55	U	550	U	64	U	61	U	610	U

Analytical Results (Qualified Data)

Case #: 33011 SDG : E1276
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1331		PBLK01							
Sampling Location :	SED-7									
Matrix :	Soil		Soil							
Units :	ug/Kg		ug/Kg							
Date Sampled :	6/22/2004									
Time Sampled :	12:40									
%Moisture :	36		N/A							
pH :	7.6									
Dilution Factor :	1.0		1.0							
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	2.6	U	1.7	U						
BETA-BHC	2.6	U	1.7	U						
DELTA-BHC	2.6	U	1.7	U						
GAMMA-BHC (LINDANE)	2.6	U	1.7	U						
HEPTACHLOR	2.6	U	1.7	U						
ALDRIN	2.6	U	1.7	U						
HEPTACHLOR EPOXIDE	2.6	U	1.7	U						
ENDOSU1FAN I	2.6	U	1.7	U						
DIELDRIN	5.1	U	3.3	U						
4,4'-DDE	5.1	U	3.3	U						
ENDRIN	5.1	U	3.3	U						
ENDOSULFAN II	5.1	U	3.3	U						
4,4'-DDD	5.1	U	3.3	U						
ENDOSULFAN SULFATE	5.1	U	3.3	U						
4,4'-DDT	5.1	U	3.3	U						
METHOXYCHLOR	26	U	17	U						
ENDRIN KETONE	5.1	U	3.3	U						
ENDRIN ALDEHYDE	5.1	U	3.3	U						
ALPHA-CHLORDANE	2.6	U	1.7	U						
GAMMA-CHLORDANE	2.6	U	1.7	U						
TOXAPHENE	260	U	170	U						
AROCLOR-1016	51	U	33	U						
AROCLOR-1221	100	U	67	U						
AROCLOR-1232	51	U	33	U						
AROCLOR-1242	51	U	33	U						
AROCLOR-1248	51	U	33	U						
AROCLOR-1254	51	U	33	U						
AROCLOR-1260	51	U	33	U						

Analytical Results (Qualified Data)

Case #: 33011 SDG : ME1276
Site : BUCYRUS CITY DUMP
Lab. : BONNER
Reviewer :
Date :

Number of Soil Samples : 7
Number of Water Samples : 0

Sample Number :	ME1276		ME1277		ME1278		ME1279		ME1329	
Sampling Location :	SED-1		SED-2		SED-3		SED-4		SED-5	
Matrix :	Soil		Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		10:00		10:30		11:00		11:35	
%Solids :	60.3		64.5		66.5		57.4		54.9	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	11500		5510		8760		8310		7580	
ANTIMONY	10.0	UJ	9.1	UJ	9.0	UJ	10.2	UJ	4.9	UJ
ARSENIC	8.6		6.3		14.3		9.7		6.9	
BARIUM	95.2		51.5	J	71.7		116		76.8	
BERYLLIUM	0.68	J	0.34	J	0.54	J	0.48	J	0.44	J
CADMIUM	0.34	J	0.55	J	0.49	J	2.9		0.33	J
CALCIUM	16600		44900		39400		45400		25500	
CHROMIUM	19.0		14.9		13.4		20.3		13.8	
COBALT	9.7	J	5.2	J	12.4	J	7.6	J	6.8	J
COPPER	49.8		17.9		30.6		33.4		40.9	
IRON	22300		12900		23500		17800		16000	
LEAD	47.0		44.8		40.2		87.5		36.1	
MAGNESIUM	7200		16700		12200		12800		7850	
MANGANESE	236		210		466		210		238	
MERCURY	0.42		0.34		0.47		1.2		0.40	
NICKEL	27.5		15.0		31.8		21.8		19.7	
POTASSIUM	2210		1310	J	2350		2080		1720	J
SELENIUM	1.3	U	5.3	U	1.2	J	6.0	U	6.4	U
SILVER	0.10	J+	1.5	U	1.5	U	0.18	J+	0.15	J+
SODIUM	137	J	144	J	130	J	169	J	115	J
THALLIUM	1.2	J	0.77	J	1.9	J	1.0	J	4.6	U
VANADIUM	26.1	R	14.4	R	21.9	R	21.3	R	18.4	R
ZINC	130		77.3		104		128		111	
CYANIDE	4.1	U	3.9	U	3.8	U	4.4	U	4.6	U

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Analytical Results (Qualified Data)

Case #: 33011 SDG : ME1276
Site : BUCYRUS CITY DUMP
Lab. : BONNER
Reviewer :
Date :

Sample Number :	ME1330		ME1331		ME1276D		ME1276S			
Sampling Location :	SED-6		SED-7		SED-1		SED-1			
Matrix :	Soil		Soil		Soil		Soil			
Units :	mg/Kg		mg/Kg		mg/Kg		mg/Kg			
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004			
Time Sampled :	11:30		12:40		09:05		09:05			
%Solids :	53.9		66.0		59.9		60.6			
Dilution Factor :	1.0		1.0		1.0		1.0			
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7370		11300		11500		11800			
ANTIMONY	4.7	UJ	9.0	UJ	10.0	U	6.2	J		
ARSENIC	6.8		22.5		8.8		21.8			
BARIUM	66.9	J	123		99.4		770			
BERYLLIUM	0.44	J	0.73	J	0.68	J	17.0			
CADMIUM	0.37	J	0.75	U	0.29	J	17.0			
CALCIUM	25700		24100		20600		18800			
CHROMIUM	14.0		15.9		15.5		81.6			
COBALT	6.5	J	25.3		9.8	J	174			
COPPER	38.8		28.7		38.4		123			
IRON	15700		35700		22000		21300			
LEAD	43.2		38.5		56.4		52.3			
MAGNESIUM	7630		7880		8040		7450			
MANGANESE	230		1110		263		392			
MERCURY	0.33		0.18		0.46		1.5			
NICKEL	18.8		37.0		25.6		190			
POTASSIUM	1660	J	2830		2240		2120			
SELENIUM	6.4	U	1.7	J	1.4	J	15.1			
SILVER	0.080	J+	1.5	U	0.11	J	15.7			
SODIUM	173	J	96.6	J	116	J	79.3	J		
THALLIUM	0.80	J	3.1	J	1.2	J	18.5			
VANADIUM	17.8	R	26.6	R	26.6		187			
ZINC	137		107		134		288			
CYANIDE	4.6	U	3.8	U	4.1	U	8.3			

DISCLAIMER: This package has been electronically assessed as an added service to our customer. It has not been either validated or approved by Region 5 and any subsequent use by the data user is strictly at the risk of the data user. Region 5 assumes no responsibility for use of unvalidated data.

Analytical Results (Qualified Data)

Case #: 32948 SDG : ME1264
Site : BUCYRUS CITY DUMP
Lab. : CHEM
Reviewer :
Date :

Sample Number	ME1264		ME1265		ME1264D		ME1264S			
Sampling Locati	GW-1		GW-2		GW-1		GW-1			
Matrix :	Water		Water		Water		Water			
Units :	ug/L		ug/L		ug/L		ug/L			
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004			
Time Sampled :	12:30		15:10		12:30		12:30			
%Solids :	0.0		0.0		0.0		0.0			
Dilution Factor :	1.0		1.0		1.0		1.0			
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	14500		100	UJ	15200		14600			
ANTIMONY	60.0	U	60.0	U	60.0	U	96.0			
ARSENIC	87.7		10.0	U	88.5		125			
BARIUM	253		28.9	UJ	244		2190			
BERYLLIUM	1.5	J	5.0	U	1.5	J	46.3			
CADMIUM	1.7	J	5.0	U	1.7	J	48.5			
CALCIUM	330000		188000		319000					
CHROMIUM	109		16.0		109		289			
COBALT	52.9		50.0	U	52.0		501			
COPPER	114		13.7	J	113		330			
IRON	91900		4440		93200		86800			
LEAD	44.1	R	10.0	R	44.4		62.2			
MAGNESIUM	87500		117000		84500					
MANGANESE	1000		79.8		987		1400			
MERCURY	0.20	U	0.10	UJ	0.070	J	0.86			
NICKEL	157		6.6	J	158		608			
POTASSIUM	14500	J	8450	J	14200					
SELENIUM	35.0	U	35.0	U	35.0	U	46.0			
SILVER	10.0	U	10.0	U	10.0	U	46.8			
SODIUM	43500	J	58200	J	41000					
THALLIUM	25.0	U	25.0	U	25.0	U	43.3			
VANADIUM	32.8	J	50.0	U	33.6	J	491			
ZINC	139		215		148		598			
CYANIDE	10.0	R	10.0	R	10.0	U	94.5			

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Region 5 assumes no responsibility for use of unvalidated data.

Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1264
BUCYRUS CITY DUMP
CEIMIC

Number of Soil Samples : 0
Number of Water Samples : 3

Sample Number :	E1264		E1264MS		E1264MSD		E1265		E1298	
Sampling Location :	GW-1		GW-1		GW-1		GW-2		TB-RAS	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/1/2004	
Time Sampled :	12:30		12:30		12:30		15:10		12:00	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
VINYL CHLORIDE	10	U	10	U	10	U	10	U	10	U
BROMOMETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROETHANE	10	U	10	U	10	U	10	U	10	U
TRICHLOROFLUOROMETHANE	10	U	10	U	10	U	10	U	10	U
1,1-DICHLOROETHENE	10	U	47		48		10	U	10	U
1,1,2-TRICHLORO-1,2,2-TRIFLU	10	U	10	U	10	U	10	U	10	U
ACETONE	10	U	10	U	10	U	10	U	10	U
CARBON DISULFIDE	10	U	10	U	10	U	10	U	10	U
METHYL ACETATE	10	U	10	U	10	U	10	U	10	U
METHYLENE CHLORIDE	10	U	1	J	10	U	10	U	10	U
TRANS-1,2-DICHLOROETHENE	10	U	10	U	10	U	10	U	10	U
METHYL TERT-BUTYL ETHER	10	U	10	U	10	U	10	U	10	U
1,1-DICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
CIS-1,2-DICHLOROETHENE	10	U	10	U	10	U	10	U	10	U
2-BUTANONE	10	U	10	U	10	U	10	U	10	U
CHLOROFORM	10	U	10	U	10	U	10	U	10	U
1,1,1-TRICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
CYCLOHEXANE	10	U	10	U	10	U	10	U	10	U
CARBON TETRACHLORIDE	10	U	10	U	10	U	10	U	10	U
BENZENE	10	U	53		55		10	U	10	U
1,2-DICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
TRICHLOROETHENE	10	U	55		58		10	U	10	U
METHYLCYCLOHEXANE	10	U	10	U	10	U	10	U	10	U
1,2-DICHLOROPROPANE	10	U	10	U	10	U	10	U	10	U
BROMODICHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
CIS-1,3-DICHLOROPROPENE	10	U	10	U	10	U	10	U	10	U
4-METHYL-2-PENTANONE	10	U	10	U	10	U	10	U	10	U
TOLUENE	10	U	55		56		10	U	10	U
TRANS-1,3-DICHLOROPROPEN	10	U	10	U	10	U	10	U	10	U
1,1,2-TRICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
TETRACHLOROETHENE	10	U	10	U	10	U	10	U	10	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1264
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1264		E1264MS		E1264MSD		E1265		E1298	
Sampling Location :	GW-1		GW-1		GW-1		GW-2		TB-RAS	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/1/2004	
Time Sampled :	12:30		12:30		12:30		15:10		12:00	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	10	U	10	U	10	U	10	U	10	U
DIBROMOCHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
1,2-DIBROMOETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROBENZENE	10	U	53		55		10	U	1	J
ETHYLBENZENE	10	U	10	U	10	U	10	U	10	U
XYLENES (TOTAL)	10	U	10	U	10	U	10	U	10	U
STYRENE	10	U	10	U	10	U	10	U	10	U
BROMOFORM	10	U	10	U	10	U	10	U	10	U
ISOPROPYLBENZENE	10	U	10	U	10	U	10	U	10	U
1,1,2,2-TETRACHLOROETHANE	10	U	10	U	10	U	10	U	10	U
1,3-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,4-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,2-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,2-DIBROMO-3-CHLOROPROP/	10	R	10	R	10	R	10	R	10	R
1,2,4-TRICHLOROBENZENE	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1264
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	VBLKLX		VBLKLZ		VHBLK01					
Sampling Location :										
Matrix :	Water		Water		Water					
Units :	ug/L		ug/L		ug/L					
Date Sampled :										
Time Sampled :										
%Moisture :	N/A		N/A		N/A					
pH :										
Dilution Factor :	1.0		1.0		1.0					
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	10	U	10	U	10	U				
CHLOROMETHANE	10	U	10	U	10	U				
VINYL CHLORIDE	10	U	10	U	10	U				
BROMOMETHANE	10	U	10	U	10	U				
CHLOROETHANE	10	U	10	U	10	U				
TRICHLOROFLUOROMETHANE	10	U	10	U	10	U				
1,1-DICHLOROETHENE	10	U	10	U	10	U				
1,1,2-TRICHLORO-1,2,2-TRIFLU	10	U	10	U	10	U				
ACETONE	10	U	10	U	10	U				
CARBON DISULFIDE	10	U	10	U	10	U				
METHYL ACETATE	10	U	10	U	10	U				
METHYLENE CHLORIDE	10	U	10	U	10	U				
TRANS-1,2-DICHLOROETHENE	10	U	10	U	10	U				
METHYL TERT-BUTYL ETHER	10	U	10	U	10	U				
1,1-DICHLOROETHANE	10	U	10	U	10	U				
CIS-1,2-DICHLOROETHENE	10	U	10	U	10	U				
2-BUTANONE	10	U	10	U	10	U				
CHLOROFORM	10	U	10	U	10	U				
1,1,1-TRICHLOROETHANE	10	U	10	U	10	U				
CYCLOHEXANE	10	U	10	U	10	U				
CARBON TETRACHLORIDE	10	U	10	U	10	U				
BENZENE	10	U	10	U	10	U				
1,2-DICHLOROETHANE	10	U	10	U	10	U				
TRICHLOROETHENE	10	U	10	U	10	U				
METHYLCYCLOHEXANE	10	U	10	U	10	U				
1,2-DICHLOROPROPANE	10	U	10	U	10	U				
BROMODICHLOROMETHANE	10	U	10	U	10	U				
CIS-1,3-DICHLOROPROPENE	10	U	10	U	10	U				
4-METHYL-2-PENTANONE	10	U	10	U	10	U				
TOLUENE	10	U	10	U	10	U				
TRANS-1,3-DICHLOROPROPEN	10	U	10	U	10	U				
1,1,2-TRICHLOROETHANE	10	U	10	U	10	U				
TETRACHLOROETHENE	10	U	10	U	10	U				

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1264
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	VBLKLX		VBLKLZ		VHBLK01					
Sampling Location :										
Matrix :	Water		Water		Water					
Units :	ug/L		ug/L		ug/L					
Date Sampled :										
Time Sampled :										
%Moisture :	N/A		N/A		N/A					
pH :										
Dilution Factor :	1.0		1.0		1.0					
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	10	U	10	U	10	U				
DIBROMOCHLOROMETHANE	10	U	10	U	10	U				
1,2-DIBROMOETHANE	10	U	10	U	10	U				
CHLOROBENZENE	10	U	10	U	10	U				
ETHYLBENZENE	10	U	10	U	10	U				
XYLENES (TOTAL)	10	U	10	U	10	U				
STYRENE	10	U	10	U	10	U				
BROMOFORM	10	U	10	U	10	U				
ISOPROPYLBENZENE	10	U	10	U	10	U				
1,1,2,2-TETRACHLOROETHANE	10	U	10	U	10	U				
1,3-DICHLOROBENZENE	10	U	10	U	10	U				
1,4-DICHLOROBENZENE	10	U	10	U	10	U				
1,2-DICHLOROBENZENE	10	U	10	U	10	U				
1,2-DIBROMO-3-CHLOROPROP/	10	R	10	R	10	R				
1,2,4-TRICHLOROBENZENE	1	J	10	UJ	10	UJ				

Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1264
BUCYRUS CITY DUMP
CEIMIC

Number of Soil Samples : 0
Number of Water Samples : 2

Sample Number :	E1264		E1264MS		E1264MSD		E1265		SBLKJP	
Sampling Location :	GW-1		GW-1		GW-1		GW-2			
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004			
Time Sampled :	12:30		12:30		12:30		15:10			
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	10	U	10	U	10	UJ	10	UJ	10	U
PHENOL	10	UJ	54		24		10	U	10	U
BIS-(2-CHLOROETHYL)ETHER	10	U	10	U	10	UJ	10	U	10	U
2-CHLOROPHENOL	10	UJ	50		23		10	U	10	U
2-METHYLPHENOL	10	U	10	U	10	U	10	U	10	U
2,2'-OXYBIS(1- CHLOROPROPANE	10	U	10	U	10	UJ	10	U	10	U
ACETOPHENONE	10	U	10	U	10	UJ	10	U	10	U
4-METHYLPHENOL	10	U	10	U	10	U	10	U	10	U
N-NITROSO-DI-N PROPYLAMINE	10	UJ	29		17	J	10	U	10	U
HEXACHLOROETHANE	10	U	10	U	10	UJ	10	U	10	U
NITROBENZENE	10	U	10	U	10	UJ	10	U	10	U
ISOPHORONE	10	U	10	U	10	UJ	10	U	10	U
2-NITROPHENOL	10	U	10	U	10	U	10	U	10	U
2,4-DIMETHYLPHENOL	10	U	10	U	10	U	10	U	10	U
BIS(2-CHLOROETHOXY)METHANE	10	U	10	U	10	UJ	10	U	10	U
2,4-DICHLOROPHENOL	10	U	10	U	10	UJ	10	UJ	10	U
NAPHTHALENE	10	U	10	U	10	UJ	10	U	10	U
4-CHLOROANILINE	10	U	10	U	10	UJ	10	U	10	U
HEXACHLOROBUTADIENE	10	U	10	U	10	UJ	10	UJ	10	U
CAPROLACTAM	10	U	1	J	10	UJ	10	U	10	U
4-CHLORO-3-METHYLPHENOL	10	U	53		41		10	U	10	U
2-METHYLNAPHTHALENE	10	U	10	U	10	UJ	10	U	10	U
HEXACHLOROCYCLO-PENTADIEN	10	U	10	U	10	UJ	10	UJ	10	U
2,4,6-TRICHLOROPHENOL	10	U	10	U	10	U	10	U	10	U
2,4,5-TRICHLOROPHENOL	25	U	25	U	25	U	25	U	25	U
1,1'-BIPHENYL	10	U	10	U	10	UJ	10	U	10	U
2-CHLORONAPHTHALENE	10	U	10	U	10	UJ	10	U	10	U
2-NITROANILINE	25	U	25	U	25	UJ	25	U	25	U
DIMETHYLPHTHALATE	10	U	10	U	10	UJ	10	U	10	U
2,6-DINITROTOLUENE	10	U	10	U	10	UJ	10	U	10	U
ACENAPHTHYLENE	10	U	10	U	10	UJ	10	U	10	U
3-NITROANILINE	25	U	25	U	25	UJ	25	U	25	U
ACENAPHTHENE	10	UJ	40		27	J	10	U	10	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1264
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1264		E1264MS		E1264MSD		E1265		SBLKJP	
Sampling Location :	GW-1		GW-1		GW-1		GW-2			
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004			
Time Sampled :	12:30		12:30		12:30		15:10			
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	25	U	25	U	25	UJ	25	UJ	25	U
4-NITROPHENOL	25	UJ	61		53		25	U	25	U
DIBENZOFURAN	10	U	10	U	10	UJ	10	U	10	U
2,4-DINITROTOLUENE	10	U	41		32	J	10	U	10	U
DIETHYLPHTHALATE	10	U	10	U	10	UJ	10	U	10	U
FLUORENE	10	U	10	U	10	UJ	10	U	10	U
4-CHLOROPHENYL-PHENYL ETHE	10	U	10	U	10	UJ	10	U	10	U
4-NITROANILINE	25	U	25	U	25	UJ	25	U	25	U
4,6-DINITRO-2-METHYLPHENOL	25	U	25	U	25	UJ	25	UJ	25	U
N-NITROSO DIPHENYLAMINE	10	U	10	U	10	UJ	10	U	10	U
4-BROMOPHENYL-PHENYLETHER	10	U	10	U	10	UJ	10	U	10	U
HEXACHLOROBENZENE	10	U	10	U	10	UJ	10	U	10	U
ATRAZINE	10	U	10	U	10	UJ	10	U	10	U
PENTACHLOROPHENOL	25	U	67		54		25	U	25	U
PHENANTHRENE	10	U	10	U	10	UJ	10	U	10	U
ANTHRACENE	10	U	10	U	10	UJ	10	U	10	U
CARBAZOLE	10	U	10	U	10	UJ	10	U	10	U
DI-N-BUTYLPHTHALATE	10	U	10	U	10	UJ	10	U	10	U
FLUORANTHENE	10	U	10	U	10	UJ	10	U	10	U
PYRENE	10	U	41		39	J	10	U	10	U
BUTYLBENZYLPHTHALATE	10	U	10	U	10	UJ	10	U	10	U
3,3'-DICHLOROBENZIDINE	10	U	10	U	10	UJ	10	U	10	U
BENZO(A)ANTHRACENE	10	U	10	U	10	UJ	10	U	10	U
CHRYSENE	10	U	10	U	10	UJ	10	U	10	U
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	10	U	10	UJ	2	J	10	U
DI-N-OCTYLPHTHALATE	10	U	10	U	10	UJ	10	U	10	U
BENZO(B)FLUORANTHENE	10	U	10	U	10	UJ	10	U	10	U
BENZO(K)FLUORANTHENE	10	U	10	U	10	UJ	10	U	10	U
BENZO(A)PYRENE	10	U	10	U	10	UJ	10	U	10	U
INDENO(1,2,3-CD)-PYRENE	10	U	10	U	10	UJ	10	U	10	U
DIBENZO(A,H)-ANTHRACENE	10	U	10	U	10	UJ	10	U	10	U
BENZO(G,H,I)PERYLENE	10	U	10	U	10	UJ	10	U	10	U

Case #: 32948
SDG : E1264
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	SBLKKF									
Sampling Location :										
Matrix :	Water									
Units :	ug/L									
Date Sampled :										
Time Sampled :										
%Moisture :	N/A									
pH :										
Dilution Factor :	1.0									
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	10	UJ								
PHENOL	10	U								
BIS-(2-CHLOROETHYL)ETHER	10	U								
2-CHLOROPHENOL	10	U								
2-METHYLPHENOL	10	U								
2,2'-OXYBIS(1- CHLOROPROPANE	10	U								
ACETOPHENONE	10	U								
4-METHYLPHENOL	10	U								
N-NITROSO-DI-N PROPYLAMINE	10	U								
HEXACHLOROETHANE	10	U								
NITROBENZENE	10	U								
ISOPHORONE	10	U								
2-NITROPHENOL	10	U								
2,4-DIMETHYLPHENOL	10	U								
BIS(2-CHLOROETHOXY)METHANE	10	U								
2,4-DICHLOROPHENOL	10	UJ								
NAPHTHALENE	10	U								
4-CHLOROANILINE	10	U								
HEXACHLOROBUTADIENE	10	UJ								
CAPROLACTAM	10	U								
4-CHLORO-3-METHYLPHENOL	10	U								
2-METHYLNAPHTHALENE	10	U								
HEXACHLOROCYCLO-PENTADIEN	10	UJ								
2,4,6-TRICHLOROPHENOL	10	U								
2,4,5-TRICHLOROPHENOL	25	U								
1,1'-BIPHENYL	10	U								
2-CHLORONAPHTHALENE	10	U								
2-NITROANILINE	25	U								
DIMETHYLPHTHALATE	10	U								
2,6-DINITROTOLUENE	10	U								
ACENAPHTHYLENE	10	U								
3-NITROANILINE	25	U								
ACENAPHTHENE	10	U								

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Analytical Results (Qualified Data)

Case #: 32948
SDG : E1264
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	SBLKKF									
Sampling Location :										
Matrix :	Water									
Units :	ug/L									
Date Sampled :										
Time Sampled :										
%Moisture :	N/A									
pH :										
Dilution Factor :	1.0									
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	25	UJ								
4-NITROPHENOL	25	U								
DIBENZOFURAN	10	U								
2,4-DINITROTOLUENE	10	U								
DIETHYLPHTHALATE	10	U								
FLUORENE	10	U								
4-CHLOROPHENYL-PHENYL ETHE	10	U								
4-NITROANILINE	25	U								
4,6-DINITRO-2-METHYLPHENOL	25	UJ								
N-NITROSO DIPHENYLAMINE	10	U								
4-BROMOPHENYL-PHENYLETHER	10	U								
HEXACHLOROBENZENE	10	U								
ATRAZINE	10	U								
PENTACHLOROPHENOL	25	U								
PHENANTHRENE	10	U								
ANTHRACENE	10	U								
CARBAZOLE	10	U								
DI-N-BUTYLPHTHALATE	10	U								
FLUORANTHENE	10	U								
PYRENE	10	U								
BUTYLBENZYLPHTHALATE	10	U								
3,3'-DICHLOROBENZIDINE	10	U								
BENZO(A)ANTHRACENE	10	U								
CHRYSENE	10	U								
BIS(2-ETHYLHEXYL)PHTHALATE	10	U								
DI-N-OCTYLPHTHALATE	10	U								
BENZO(B)FLUORANTHENE	10	U								
BENZO(K)FLUORANTHENE	10	U								
BENZO(A)PYRENE	10	U								
INDENO(1,2,3-CD)-PYRENE	10	U								
DIBENZO(A,H)-ANTHRACENE	10	U								
BENZO(G,H,I)PERYLENE	10	U								

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1264
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Number of Soil Samples : 0
Number of Water Samples : 2

Sample Number :	E1264		E1264MS		E1264MSD		E1265		PBLK01	
Sampling Location :	GW-1		GW-1		GW-1		GW-2			
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004			
Time Sampled :	12:30		12:30		12:30		15:10			
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Pesticide/PCB Compoun	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
BETA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
DELTA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
GAMMA-BHC (LINDANE	0.050	UJ	0.16		0.17		0.050	U	0.050	U
HEPTACHLOR	0.050	UJ	0.13		0.13		0.050	U	0.050	U
ALDRIN	0.050	UJ	0.14		0.15		0.050	U	0.050	U
HEPTACHLOR EPOXIDE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
ENDOSU1FAN I	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
DIELDRIN	0.10	UJ	0.38		0.38		0.10	U	0.10	U
4,4'-DDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDRIN	0.10	UJ	0.40		0.41		0.10	U	0.10	U
ENDOSULFAN II	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDD	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDOSULFAN SULFATE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDT	0.10	UJ	0.35		0.38		0.10	U	0.10	U
METHOXYCHLOR	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
ENDRIN KETONE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDRIN ALDEHYDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ALPHA-CHLORDANE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
GAMMA-CHLORDANE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
TOXAPHENE	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
AROCLOR-1016	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1221	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
AROCLOR-1232	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1242	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1248	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1254	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1260	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

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Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1271
BUCYRUS CITY DUMP
SHEALY

Number of Soil Samples : 0
Number of Water Samples : 6

Sample Number :	E1271		E1271MS		E1271MSD		E1272		E1273	
Sampling Location :	RW-1		RW-1		RW-1		RW-2		RW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	10:35		10:35		10:35		12:00		14:25	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	0.50	U	0.50	UJ	0.50	UJ	0.50	U	0.50	U
Chloromethane	11		13		14		0.50	U	0.50	U
Vinyl Chloride	0.50	U	0.043	J	0.050	J	0.50	U	0.50	U
Bromomethane	2.0		0.73		0.64		0.048	J	0.50	U
Chloroethane	0.62		5.9		3.3		0.092	J	0.50	U
Trichlorofluoromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene	0.50	UJ	2.7		3.0		0.50	UJ	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	0.073	J	0.50	U	0.50	U	0.50	U
Acetone	5.0	U	2.1	J	1.9	J	5.0	U	5.0	U
Carbon Disulfide	0.50	UJ	0.68		0.65		0.50	U	0.50	U
Methyl Acetate	0.50	UJ	0.64	J	0.062	J	0.50	UJ	0.50	UJ
Methylene Chloride	0.50	UJ	0.50	UJ	0.50	UJ	0.50	U	0.50	U
trans-1,2-Dichloroethene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl tert-Butyl Ether	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Butanone	5.0	U	0.37	J	0.36	J	5.0	U	5.0	U
Bromochloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	1.0		0.56		0.65		0.50	U	0.50	U
1,1,1-Trichloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane	0.50	UJ	0.13	J	0.13	J	0.50	UJ	0.50	UJ
Carbon Tetrachloride	0.077	J	0.066	J	0.059	J	0.50	U	0.50	U
Benzene	0.047	J	4.4		4.6		0.042	J	0.50	U
1,2-Dichloroethane	0.50	U	0.033	J	0.052	J	0.50	U	0.50	U
Trichloroethene	0.50	U	4.3		4.6		0.50	U	0.50	U
Methylcyclohexane	0.50	U	0.50	UJ	0.50	UJ	0.50	U	0.63	
1,2-Dichloropropane	0.50	U	0.013	J	0.0067	J	0.50	U	0.50	U
Bromodichloromethane	0.50	U	0.50	U	0.16	J	0.50	U	0.50	U
cis-1,3-Dichloropropene	0.50	U	0.090	J	0.097	J	0.50	U	0.50	U
4-Methyl-2-pentanone	5.0	U	1.1	J	0.36	J	5.0	U	5.0	U
Toluene	0.50	U	4.3	J	4.5	J	0.50	U	0.50	U
trans-1,3-Dichloropropene	0.50	U	0.16	J	0.18	J	0.50	U	0.50	U
1,1,2-Trichloroethane	0.50	U	0.50	UJ	0.50	UJ	0.50	U	0.50	U

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1271
BUCYRUS CITY DUMP
SHEALY

Sample Number :	E1271		E1271MS		E1271MSD		E1272		E1273	
Sampling Location :	RW-1		RW-1		RW-1		RW-2		RW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	10:35		10:35		10:35		12:00		14:25	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Tetrachloroethene	0.50	UJ	0.50	U	0.50	U	0.50	U	0.50	U
2-Hexanone	5.0	U	0.25	J	5.0	U	5.0	U	5.0	U
Dibromochloromethane	0.050	J	0.50	U	0.028	J	0.50	U	0.50	U
1,2-Dibromoethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	0.50	UJ	4.2	J	4.4	J	0.50	UJ	0.50	UJ
Ethylbenzene	0.50	U	0.50	UJ	0.50	UJ	0.50	U	0.50	U
Xylenes (total)	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Styrene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform	0.50	UJ	0.50	U	0.073	J	0.50	U	0.50	UJ
Isopropylbenzene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2,2-Tetrachloroethane	0.50	U	0.012	J	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,4-Dichlorobenzene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichlorobenzene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromo-3-chloropropane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-Trichlorobenzene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,3-Trichlorobenzene	0.50	U	0.50	UJ	0.50	U	0.50	U	0.50	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1271
Site : BUCYRUS CITY DUMP
Lab. : SHEALY
Reviewer :
Date :

Sample Number :	E1274		E1275		E1297		VBLK07		VBLK08	
Sampling Location :	RW-4		RW-5		TB-SAS					
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/1/2004					
Time Sampled :	10:00		10:05		12:00					
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	4.4		3.7		0.50	U	0.50	U	0.50	UJ
Chloromethane	0.49	J	0.50	U	0.50	U	0.50	U	0.50	U
Vinyl Chloride	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichlorofluoromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethene	0.50	U	0.50	U	0.50	U	0.076	J	0.50	U
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Acetone	5.0	U	5.0	U	6.4		5.0	U	5.0	U
Carbon Disulfide	0.50	U	0.50	UJ	0.50	UJ	0.043	J	0.081	J
Methyl Acetate	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ
Methylene Chloride	0.50	U	0.50	U	0.50	UJ	0.25	J	0.35	J
trans-1,2-Dichloroethene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methyl tert-Butyl Ether	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1-Dichloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,2-Dichloroethene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
2-Butanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromochloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cyclohexane	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	U
Carbon Tetrachloride	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Benzene	0.042	J	0.50	U	0.41	J	0.50	U	0.054	J
1,2-Dichloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Trichloroethene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Methylcyclohexane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	UJ
1,2-Dichloropropane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromodichloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
cis-1,3-Dichloropropene	0.50	U	0.50	U	0.50	UJ	0.50	U	0.50	U
4-Methyl-2-pentanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Toluene	0.50	U	0.50	U	0.50	UJ	0.14	J	0.11	J
trans-1,3-Dichloropropene	0.50	U	0.50	U	0.50	UJ	0.50	U	0.50	U
1,1,2-Trichloroethane	0.50	U	0.50	U	0.50	UJ	0.50	U	0.50	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1271
Site : BUCYRUS CITY DUMP
Lab. : SHEALY
Reviewer :
Date :

Sample Number :	E1274		E1275		E1297		VBLK07		VBLK08	
Sampling Location :	RW-4		RW-5		TB-SAS					
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/1/2004					
Time Sampled :	10:00		10:05		12:00					
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Tetrachloroethene	0.50	U	0.50	U	0.50	U	0.13	J	0.22	J
2-Hexanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibromochloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dibromoethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chlorobenzene	0.50	UJ	0.50	UJ	0.95	J	0.16	J	0.18	J
Ethylbenzene	0.50	U	0.50	U	0.015	J	0.50	U	0.032	J
Xylenes (total)	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Styrene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromoform	0.50	U	0.50	U	0.50	U	0.15	J	0.50	U
Isopropylbenzene	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,2,2-Tetrachloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,3-Dichlorobenzene	0.50	U	0.50	U	0.50	U	0.098	J	0.096	J
1,4-Dichlorobenzene	0.50	U	0.50	U	0.50	U	0.11	J	0.13	J
1,2-Dichlorobenzene	0.50	U	0.50	U	0.50	U	0.095	J	0.10	J
1,2-Dibromo-3-chloropropane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2,4-Trichlorobenzene	0.50	U	0.50	U	0.50	U	0.081	J	0.14	J
1,2,3-Trichlorobenzene	0.50	U	0.50	U	0.50	U	0.50	U	0.084	J

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1271
Site : BUCYRUS CITY DUMP
Lab. : SHEALY
Reviewer :
Date :

Sample Number :	VHBLK31									
Sampling Location :										
Matrix :	Water									
Units :	ug/L									
Date Sampled :										
Time Sampled :										
%Moisture :	N/A									
pH :										
Dilution Factor :	1.0									
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	0.50	UJ								
Chloromethane	0.50	U								
Vinyl Chloride	0.50	U								
Bromomethane	0.50	U								
Chloroethane	0.50	U								
Trichlorofluoromethane	0.50	U								
1,1-Dichloroethene	0.50	U								
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U								
Acetone	5.0	U								
Carbon Disulfide	0.50	U								
Methyl Acetate	0.50	UJ								
Methylene Chloride	0.36	J								
trans-1,2-Dichloroethene	0.50	U								
Methyl tert-Butyl Ether	0.50	U								
1,1-Dichloroethane	0.50	U								
cis-1,2-Dichloroethene	0.50	U								
2-Butanone	5.0	U								
Bromochloromethane	0.50	U								
Chloroform	0.50	U								
1,1,1-Trichloroethane	0.50	U								
Cyclohexane	0.50	U								
Carbon Tetrachloride	0.50	U								
Benzene	0.50	U								
1,2-Dichloroethane	0.50	U								
Trichloroethene	0.50	U								
Methylcyclohexane	0.50	UJ								
1,2-Dichloropropane	0.50	U								
Bromodichloromethane	0.50	U								
cis-1,3-Dichloropropene	0.50	U								
4-Methyl-2-pentanone	5.0	U								
Toluene	0.39	J								
trans-1,3-Dichloropropene	0.50	U								
1,1,2-Trichloroethane	0.50	U								

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Case #: 32948	SDG : E1271
Site :	BUCYRUS CITY DUMP
Lab. :	SHEALY
Reviewer :	
Date :	

Sample Number :	VHBLK31									
Sampling Location :										
Matrix :	Water									
Units :	ug/L									
Date Sampled :										
Time Sampled :										
%Moisture :	N/A									
pH :										
Dilution Factor :	1.0									
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Tetrachloroethene	0.50	U								
2-Hexanone	5.0	U								
Dibromochloromethane	0.50	U								
1,2-Dibromoethane	0.50	U								
Chlorobenzene	0.61	J								
Ethylbenzene	0.50	U								
Xylenes (total)	0.50	U								
Styrene	0.50	U								
Bromoform	0.50	U								
Isopropylbenzene	0.50	U								
1,1,2,2-Tetrachloroethane	0.50	U								
1,3-Dichlorobenzene	0.50	U								
1,4-Dichlorobenzene	0.50	U								
1,2-Dichlorobenzene	0.50	U								
1,2-Dibromo-3-chloropropane	0.50	U								
1,2,4-Trichlorobenzene	0.50	U								
1,2,3-Trichlorobenzene	0.50	U								

Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1271
BUCYRUS CITY DUMP
SHEALY

Number of Soil Samples : 0
Number of Water Samples : 5

Sample Number :	E1271		E1271MS		E1271MSD		E1272		E1273	
Sampling Location :	RW-1		RW-1		RW-1		RW-2		RW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	10:35		10:35		10:35		12:00		14:25	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Benzaldehyde	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ
Phenol	5.0	U	75		61		5.0	U	5.0	U
bis-(2-Chloroethyl) ether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chlorophenol	5.0	U	72		58		5.0	U	5.0	U
2-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,2'-oxybis(1-Chloropropane)	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetophenone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
N-Nitroso-di-n-propylamine	5.0	U	13		11		5.0	U	5.0	U
Hexachloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Isophorone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitrophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
bis(2-Chloroethoxy)methane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloroaniline	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobutadiene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam	5.0	U	9.4		5.0	U	5.0	U	5.0	U
4-Chloro-3-methylphenol	5.0	UJ	78		64		5.0	U	5.0	U
2-Methylnaphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorocyclopentadiene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,6-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U
1,1'-Biphenyl	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chloronaphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline	20	U	20	U	20	U	20	U	20	U
Dimethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U
Acenaphthene	5.0	U	15		13		5.0	U	5.0	U

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Analytical Results (Qualified Data)

Case #: 32948 SDG : E1271
Site : BUCYRUS CITY DUMP
Lab. : SHEALY
Reviewer :
Date :

Sample Number :	E1271		E1271MS		E1271MSD		E1272		E1273	
Sampling Location :	RW-1		RW-1		RW-1		RW-2		RW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	10:35		10:35		10:35		12:00		14:25	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-Dinitrophenol	20	U	20	U	20	U	20	U	20	U
4-Nitrophenol	20	U	60		55		20	U	20	U
Dibenzofuran	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene	5.0	U	14		13		5.0	U	5.0	U
Diethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluorene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	20	U	20	U	20	U	20	U	20	U
N-Nitrosodiphenylamine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Atrazine	5.0	R	5.0	R	5.0	R	5.0	R	5.0	R
Pentachlorophenol	5.0	U	66		52		5.0	U	5.0	U
Phenanthrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Anthracene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-butylphthalate	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ
Fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pyrene	5.0	U	18		17		5.0	U	5.0	U
Butylbenzylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3,3'-Dichlorobenzidine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)anthracene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chrysene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
bis(2-Ethylhexyl)phthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-octylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(b)fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(k)fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)pyrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibenzo(a,h)anthracene	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ
Benzo(g,h,i)perylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Analytical Results (Qualified Data)

Case #: 32948 SDG : E1271
Site : BUCYRUS CITY DUMP
Lab. : SHEALY
Reviewer :
Date :

Sample Number :	E1274		E1275		SBLK96		SBLK96RE			
Sampling Location :	RW-4		RW-5							
Matrix :	Water		Water		Water		Water			
Units :	ug/L		ug/L		ug/L		ug/L			
Date Sampled :	6/2/2004		6/2/2004							
Time Sampled :	10:00		10:05							
%Moisture :	N/A		N/A		N/A		N/A			
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0			
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Benzaldehyde	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ		
Phenol	5.0	U	5.0	U	5.0	U	5.0	U		
bis-(2-Chloroethyl) ether	5.0	U	5.0	U	5.0	U	5.0	U		
2-Chlorophenol	5.0	U	5.0	U	5.0	U	5.0	U		
2-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U		
2,2'-oxybis(1-Chloropropane)	5.0	U	5.0	U	5.0	U	5.0	U		
Acetophenone	5.0	U	5.0	U	5.0	U	5.0	U		
4-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U		
N-Nitroso-di-n-propylamine	5.0	U	5.0	U	5.0	U	5.0	U		
Hexachloroethane	5.0	U	5.0	U	5.0	U	5.0	U		
Nitrobenzene	5.0	U	5.0	U	5.0	U	5.0	U		
Isophorone	5.0	U	5.0	U	5.0	U	5.0	U		
2-Nitrophenol	5.0	U	5.0	U	5.0	U	5.0	U		
2,4-Dimethylphenol	5.0	U	5.0	U	5.0	U	5.0	U		
bis(2-Chloroethoxy)methane	5.0	U	5.0	U	5.0	U	5.0	U		
2,4-Dichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U		
Naphthalene	5.0	U	5.0	U	5.0	U	5.0	U		
4-Chloroaniline	5.0	U	5.0	U	5.0	U	5.0	U		
Hexachlorobutadiene	5.0	U	5.0	U	5.0	U	5.0	U		
Caprolactam	5.0	U	5.0	U	5.0	U	5.0	U		
4-Chloro-3-methylphenol	5.0	U	5.0	U	5.0	U	5.0	U		
2-Methylnaphthalene	5.0	U	5.0	U	5.0	U	5.0	U		
Hexachlorocyclopentadiene	5.0	U	5.0	U	5.0	U	5.0	U		
2,4,6-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U		
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U		
1,1'-Biphenyl	5.0	U	5.0	U	5.0	U	5.0	U		
2-Chloronaphthalene	5.0	U	5.0	U	5.0	U	5.0	U		
2-Nitroaniline	20	U	20	U	20	U	20	U		
Dimethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U		
2,6-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U		
Acenaphthylene	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ		
3-Nitroaniline	20	U	20	U	20	U	20	U		
Acenaphthene	5.0	U	5.0	U	5.0	U	5.0	U		

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Analytical Results (Qualified Data)

Case #: 32948 SDG : E1271
Site : BUCYRUS CITY DUMP
Lab. : SHEALY
Reviewer :
Date :

Sample Number :	E1274		E1275		SBLK96		SBLK96RE			
Sampling Location :	RW-4		RW-5							
Matrix :	Water		Water		Water		Water			
Units :	ug/L		ug/L		ug/L		ug/L			
Date Sampled :	6/2/2004		6/2/2004							
Time Sampled :	10:00		10:05							
%Moisture :	N/A		N/A		N/A		N/A			
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0			
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-Dinitrophenol	20	U	20	U	20	U	20	U		
4-Nitrophenol	20	U	20	U	20	U	20	U		
Dibenzofuran	5.0	U	5.0	U	5.0	U	5.0	U		
2,4-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U		
Diethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U		
Fluorene	5.0	U	5.0	U	5.0	U	5.0	U		
4-Chlorophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U		
4-Nitroaniline	20	U	20	U	20	U	20	U		
4,6-Dinitro-2-methylphenol	20	U	20	U	20	U	20	U		
N-Nitrosodiphenylamine	5.0	U	5.0	U	5.0	U	5.0	U		
1,2,4,5-Tetrachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U		
4-Bromophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U		
Hexachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U		
Atrazine	5.0	R	5.0	R	5.0	R	5.0	R		
Pentachlorophenol	5.0	U	5.0	U	5.0	U	5.0	U		
Phenanthrene	5.0	U	5.0	U	5.0	U	5.0	U		
Anthracene	5.0	U	5.0	U	5.0	U	5.0	U		
Di-n-butylphthalate	5.0	UJ	5.0	UJ	1.2	J	1.2	J		
Fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U		
Pyrene	5.0	U	5.0	U	5.0	U	5.0	U		
Butylbenzylphthalate	5.0	U	5.0	U	5.0	U	5.0	U		
3,3'-Dichlorobenzidine	5.0	U	5.0	U	5.0	U	5.0	U		
Benzo(a)anthracene	5.0	U	5.0	U	5.0	U	5.0	U		
Chrysene	5.0	U	5.0	U	5.0	U	5.0	U		
bis(2-Ethylhexyl)phthalate	5.0	U	5.0	U	5.0	U	5.0	U		
Di-n-octylphthalate	5.0	U	5.0	U	5.0	U	5.0	U		
Benzo(b)fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U		
Benzo(k)fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U		
Benzo(a)pyrene	5.0	U	5.0	U	5.0	U	5.0	U		
Indeno(1,2,3-cd)pyrene	5.0	U	5.0	U	5.0	U	5.0	U		
Dibenzo(a,h)anthracene	5.0	UJ	5.0	UJ	5.0	VS	5.0	VS		
Benzo(g,h,i)perylene	5.0	U	5.0	U	5.0	U	5.0	U		

Analytical Results (Qualified Data)

Case #: 32948
Site :
Lab. :
Reviewer :
Date :

SDG : E1271
BUCYRUS CITY DUMP
SHEALY

Number of Soil Samples : 0
Number of Water Samples : 5

Sample Number :	E1271		E1271MS		E1271MSD		E1272		E1273	
Sampling Location :	RW-1		RW-1		RW-1		RW-2		RW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :	10:35		10:35		10:35		12:00		14:25	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
beta-BHC	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
delta-BHC	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
gamma-BHC (Lindane)	0.010	UJ	0.030		0.033		0.010	U	0.010	U
Heptachlor	0.010	UJ	0.021		0.031		0.010	U	0.010	U
Aldrin	0.010	UJ	0.031		0.035		0.010	U	0.010	U
Heptachlor epoxide	0.010	UJ	0.010	UJ	0.010	U	0.010	U	0.010	U
Endosulfan I	0.010	UJ	0.010	UJ	0.010	U	0.010	U	0.020	U
Dieldrin	0.020	UJ	0.079	J	0.084		0.020	U	0.020	U
4,4'-DDE	0.020	UJ	0.020	UJ	0.020	U	0.020	U	0.020	U
Endrin	0.020	UJ	0.079	J	0.085		0.020	U	0.020	U
Endosulfan II	0.020	UJ	0.020	UJ	0.020	U	0.020	U	0.020	U
4,4'-DDD	0.020	UJ	0.020	UJ	0.020	U	0.020	U	0.020	U
Endosulfan sulfate	0.020	UJ	0.020	UJ	0.020	U	0.020	U	0.020	U
4,4'-DDT	0.020	UJ	0.065	J	0.077		0.020	U	0.020	U
Methoxychlor	0.10	UJ	0.10	UJ	0.10	U	0.10	U	0.10	U
Endrin ketone	0.020	UJ	0.020	UJ	0.020	U	0.020	U	0.020	U
Endrin aldehyde	0.020	UJ	0.020	UJ	0.020	U	0.020	U	0.020	U
alpha-Chlordane	0.010	UJ	0.010	UJ	0.010	U	0.010	U	0.010	U
gamma-Chlordane	0.010	UJ	0.010	UJ	0.010	U	0.010	U	0.010	U
Toxaphene	1.0	UJ	1.0	UJ	1.0	U	1.0	U	1.0	U
Aroclor-1016	0.20	UJ	0.20	UJ	0.20	U	0.20	U	0.20	U
Aroclor-1221	0.40	UJ	0.40	UJ	0.40	U	0.40	U	0.40	U
Aroclor-1232	0.20	UJ	0.20	UJ	0.20	U	0.20	U	0.20	U
Aroclor-1242	0.20	UJ	0.20	UJ	0.20	U	0.20	U	0.20	U
Aroclor-1248	0.20	UJ	0.20	UJ	0.20	U	0.20	U	0.20	U
Aroclor-1254	0.20	UJ	0.20	UJ	0.20	U	0.20	U	0.20	U
Aroclor-1260	0.20	UJ	0.20	UJ	0.20	U	0.20	U	0.20	U

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Analytical Results (Qualified Data)

Case #: 32948 SDG : E1271
Site : BUCYRUS CITY DUMP
Lab. : SHEALY
Reviewer :
Date :

Sample Number :	E1274		E1275		PBLK97					
Sampling Location :	RW-4		RW-5							
Matrix :	Water		Water		Water					
Units :	ug/L		ug/L		ug/L					
Date Sampled :	6/2/2004		6/2/2004							
Time Sampled :	10:00		10:05							
%Moisture :	N/A		N/A		N/A					
pH :										
Dilution Factor :	1.0		1.0		1.0					
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	0.010	U	0.010	U	0.010	U				
beta-BHC	0.010	U	0.010	U	0.010	U				
delta-BHC	0.010	U	0.010	U	0.010	U				
gamma-BHC (Lindane)	0.010	U	0.010	U	0.010	U				
Heptachlor	0.010	U	0.010	U	0.010	U				
Aldrin	0.010	U	0.010	U	0.010	U				
Heptachlor epoxide	0.010	U	0.010	U	0.010	U				
Endosulfan I	0.010	U	0.010	U	0.010	U				
Dieldrin	0.020	U	0.020	U	0.020	U				
4,4'-DDE	0.020	U	0.020	U	0.020	U				
Endrin	0.020	U	0.020	U	0.020	U				
Endosulfan II	0.020	U	0.020	U	0.020	U				
4,4'-DDD	0.020	U	0.020	U	0.020	U				
Endosulfan sulfate	0.020	U	0.020	U	0.020	U				
4,4'-DDT	0.020	U	0.020	U	0.020	U				
Methoxychlor	0.10	U	0.10	U	0.10	U				
Endrin ketone	0.020	U	0.020	U	0.020	U				
Endrin aldehyde	0.020	U	0.020	U	0.020	U				
alpha-Chlordane	0.010	U	0.010	U	0.010	U				
gamma-Chlordane	0.010	U	0.010	U	0.010	U				
Toxaphene	1.0	U	1.0	U	1.0	U				
Aroclor-1016	0.20	U	0.20	U	0.20	U				
Aroclor-1221	0.40	U	0.40	U	0.40	U				
Aroclor-1232	0.20	U	0.20	U	0.20	U				
Aroclor-1242	0.20	U	0.20	U	0.20	U				
Aroclor-1248	0.20	U	0.20	U	0.20	U				
Aroclor-1254	0.20	U	0.20	U	0.20	U				
Aroclor-1260	0.20	U	0.20	U	0.20	U				

Analytical Results (Qualified Data)

Case #: 32948 SDG : ME1271

Site : BUCYRUS CITY DUMP

Lab. : SENTIN

Number of Soil Samples : 0

Number of Water Samples : 5

Sample Number :		ME1271		ME1272		ME1273		ME1274		ME1275	
Sampling Location :		RW-1		RW-2		RW-3		RW-4		RW-5	
Matrix :		Water		Water		Water		Water		Water	
Units :		ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :		6/2/2004		6/2/2004		6/2/2004		6/2/2004		6/2/2004	
Time Sampled :		10:35		12:00		14:25		10:00		10:05	
ANALYTE		Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	200ug/L										
ANTIMONY	60ug/L	1.1	UJ	0.66	UJ	0.88	UJ	1.0	UJ	0.92	UJ
ARSENIC	10ug/L	1.0	U	1.0	U	0.17	J	1.0	U	1.0	U
BARIUM	200ug/L	333		14.1		33.4		521		513	
BERYLLIUM	5ug/L	0.050	J	1.0	U	1.0	U	1.0	U	1.0	U
CADMIUM	5ug/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
CHROMIUM	10ug/L	0.13	J	0.060	J	0.28	J	0.18	J	0.12	J
COBALT	50ug/L	0.070	J	0.36	J	0.38	J	0.14	J	0.13	J
COPPER	25ug/L	3.0		0.62	J	14.0		1.1	J	0.80	J
LEAD	3ug/L	0.16	J	0.090	J	2.0		0.72	J	0.51	J
MANGANESE	15ug/L	15.2		66.6		153		12.9		11.6	
MERCURY	0.2ug/L	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
NICKEL	40ug/L	0.85	J	2.3		4.5		0.86	J	0.78	J
SELENIUM	5ug/L	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ
SILVER	10ug/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
THALLIUM	10ug/L	1.0	U	1.0	U	0.13	J	1.0	U	1.0	U
VANADIUM	50ug/L	1.0	U	0.19	J	0.54	J	0.10	J	1.0	U
ZINC	20ug/L	67.8		31.6		151		139		92.5	
CYANIDE	10ug/L	10.0	U	1.7	J	10.0	U	10.0	U	10.0	U

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Analytical Results (Qualified Data)

Case #: 32948 SDG : ME1271
Site : BUCYRUS CITY DUMP
Lab. : SENTIN
Reviewer :
Date :

Sample Number :		ME1271D		ME1271S							
Sampling Location :		RW-1		RW-1							
Matrix :		Water		Water							
Units :		ug/L		ug/L							
Date Sampled :		6/2/2004		6/2/2004							
Time Sampled :		10:35		10:35							
%Solids :		0.0		0.0							
Dilution Factor :		1.0		1.0							
ANALYTE		Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	200ug/L										
ANTIMONY	60ug/L	0.81	J	101							
ARSENIC	10ug/L	1.0	U	36.2							
BARIUM	200ug/L	321		2460							
BERYLLIUM	5ug/L	1.0	U	56.1							
CADMIUM	5ug/L	1.0	U	51.4							
CHROMIUM	10ug/L	0.11	J	218							
COBALT	50ug/L	0.060	J	492							
COPPER	25ug/L	2.2		253							
LEAD	3ug/L	0.13	J	21.7							
MANGANESE	15ug/L	14.5		474							
MERCURY	0.2ug/L	0.20	U	1.0							
NICKEL	40ug/L	0.80	J	515							
SELENIUM	5ug/L	5.0	U	2.1	J						
SILVER	10ug/L	1.0	U	40.0							
THALLIUM	10ug/L	1.0	U	54.8							
VANADIUM	50ug/L	0.060	J	535							
ZINC	20ug/L	62.2		586							
CYANIDE		10.0	U	94.5							

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Analytical Results (Qualified Data)

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Number of Soil Samples : 0
Number of Water Samples : 9

Sample Number :	E1289		E1289MS		E1289MSD		E1290		E1291	
Sampling Location :	SW-1		SW-1		SW-1		SW-2		SW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		10:10		10:15	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
VINYL CHLORIDE	10	U	10	U	10	U	10	U	10	U
BROMOMETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROETHANE	10	U	10	UJ	10	UJ	10	U	10	U
TRICHLOROFLUOROMETHANE	10	U	10	UJ	10	UJ	10	U	10	U
1,1-DICHLOROETHENE	10	U	49		50		10	U	10	U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	10	U	10	UJ	10	UJ	10	U	10	U
ACETONE	10	U	4	J	10	U	10	U	10	U
CARBON DISULFIDE	10	U	10	U	10	U	10	U	10	U
METHYL ACETATE	10	U	10	U	10	U	10	U	10	U
METHYLENE CHLORIDE	10	U	1	J	2	J	10	U	10	U
TRANS-1,2-DICHLOROETHENE	10	U	10	U	10	U	10	U	10	U
METHYL TERT-BUTYL ETHER	10	U	10	U	10	U	10	U	10	U
1,1-DICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
CIS-1,2-DICHLOROETHENE	10	U	10	U	10	U	10	U	10	U
2-BUTANONE	10	U	10	U	10	U	10	U	10	U
CHLOROFORM	10	U	10	U	10	U	10	U	10	U
1,1,1-TRICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
CYCLOHEXANE	10	U	10	U	10	U	10	U	10	U
CARBON TETRACHLORIDE	10	U	10	U	10	U	10	U	10	U
BENZENE	10	U	51		52		10	U	10	U
1,2-DICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
TRICHLOROETHENE	10	U	53		55		10	U	10	U
METHYLCYCLOHEXANE	10	U	10	U	10	U	10	U	10	U
1,2-DICHLOROPROPANE	10	U	10	U	10	U	10	U	10	U
BROMODICHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
CIS-1,3-DICHLOROPROPENE	10	U	10	U	10	U	10	U	10	U
4-METHYL-2-PENTANONE	10	U	10	U	10	U	10	U	10	U
TOLUENE	10	U	53		55		10	U	10	U
TRANS-1,3-DICHLOROPROPENE	10	U	10	U	10	U	10	U	10	U
1,1,2-TRICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
TETRACHLOROETHENE	10	U	10	U	10	U	10	U	10	U

Case #: 33011
SDG : E1289
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1289		E1289MS		E1289MSD		E1290		E1291	
Sampling Location :	SW-1		SW-1		SW-1		SW-2		SW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		10:10		10:15	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	10	U	10	U	10	U	10	U	10	U
DIBROMOCHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
1,2-DIBROMOETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROBENZENE	10	U	53		54		10	U	10	U
ETHYLBENZENE	10	U	10	U	10	U	10	U	10	U
XYLENES (TOTAL)	10	U	10	U	10	U	10	U	10	U
STYRENE	10	U	10	U	10	U	10	U	10	U
BROMOFORM	10	U	10	U	10	U	10	U	10	U
ISOPROPYLBENZENE	10	U	10	U	10	U	10	U	10	U
1,1,2,2-TETRACHLOROETHANE	10	U	10	U	10	U	10	U	10	U
1,3-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,4-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,2-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,2-DIBROMO-3-CHLOROPROPANE	10	U	10	U	10	U	10	U	10	U
1,2,4-TRICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1292		E1293		E1294		E1295		E1296	
Sampling Location :	SW-4		SW-5		SW-6		SW-7		SW-8	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	11:45		11:20		12:00		12:15		12:40	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
VINYL CHLORIDE	10	U	10	U	10	U	10	U	10	U
BROMOMETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROETHANE	10	U	10	U	10	UJ	10	UJ	10	UJ
TRICHLOROFLUOROMETHANE	10	U	10	U	10	UJ	10	UJ	10	UJ
1,1-DICHLOROETHENE	10	U	10	U	10	U	10	U	10	U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANI	10	U	10	U	10	UJ	10	UJ	10	UJ
ACETONE	10	U	10	U	3	J	10	U	4	J
CARBON DISULFIDE	10	U	10	U	10	U	10	U	10	U
METHYL ACETATE	10	U	10	U	10	U	10	U	10	U
METHYLENE CHLORIDE	10	U	10	U	10	U	10	U	10	U
TRANS-1,2-DICHLOROETHENE	10	U	10	U	10	U	10	U	10	U
METHYL TERT-BUTYL ETHER	10	U	10	U	10	U	10	U	10	U
1,1-DICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
CIS-1,2-DICHLOROETHENE	10	U	10	U	10	U	10	U	10	U
2-BUTANONE	10	U	10	U	10	U	10	U	10	U
CHLOROFORM	10	U	10	U	10	U	10	U	10	U
1,1,1-TRICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
CYCLOHEXANE	10	U	10	U	10	U	10	U	10	U
CARBON TETRACHLORIDE	10	U	10	U	10	U	10	U	10	U
BENZENE	10	U	10	U	10	U	10	U	10	U
1,2-DICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
TRICHLOROETHENE	10	U	10	U	10	U	10	U	10	U
METHYLCYCLOHEXANE	10	U	10	U	10	U	10	U	10	U
1,2-DICHLOROPROPANE	10	U	10	U	10	U	10	U	10	U
BROMODICHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
CIS-1,3-DICHLOROPROPENE	10	U	10	U	10	U	10	U	10	U
4-METHYL-2-PENTANONE	10	U	10	U	10	U	10	U	10	U
TOLUENE	10	U	10	U	10	U	10	U	10	U
TRANS-1,3-DICHLOROPROPENE	10	U	10	U	10	U	10	U	10	U
1,1,2-TRICHLOROETHANE	10	U	10	U	10	U	10	U	10	U
TETRACHLOROETHENE	10	U	10	U	10	U	10	U	10	U

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1292		E1293		E1294		E1295		E1296	
Sampling Location :	SW-4		SW-5		SW-6		SW-7		SW-8	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	11:45		11:20		12:00		12:15		12:40	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	10	U	10	U	10	U	10	U	10	U
DIBROMOCHLOROMETHANE	10	U	10	U	10	U	10	U	10	U
1,2-DIBROMOETHANE	10	U	10	U	10	U	10	U	10	U
CHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
ETHYLBENZENE	10	U	10	U	10	U	10	U	10	U
XYLENES (TOTAL)	10	U	10	U	10	U	10	U	10	U
STYRENE	10	U	10	U	10	U	10	U	10	U
BROMOFORM	10	U	10	U	10	U	10	U	10	U
ISOPROPYLBENZENE	10	U	10	U	10	U	10	U	10	U
1,1,2,2-TETRACHLOROETHANE	10	U	10	U	10	U	10	U	10	U
1,3-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,4-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,2-DICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
1,2-DIBROMO-3-CHLOROPROPANE	10	U	10	U	10	U	10	U	10	U
1,2,4-TRICHLOROBENZENE	10	U	10	U	10	U	10	U	10	U

Analytical Results (Qualified Data)

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1332		VBLKLQ		VBLKLR		VHBLK01			
Sampling Location :	TRIP BLANK									
Matrix :	Water		Water		Water		Water			
Units :	ug/L		ug/L		ug/L		ug/L			
Date Sampled :	6/22/2004									
Time Sampled :	12:00									
%Moisture :	N/A		N/A		N/A		N/A			
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0			
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
DICHLORODIFLUOROMETHANE	10	U	10	U	10	U	10	U		
CHLOROMETHANE	10	U	10	U	10	U	10	U		
VINYL CHLORIDE	10	U	10	U	10	U	10	U		
BROMOMETHANE	10	U	10	U	10	U	10	U		
CHLOROETHANE	10	UJ	10	U	10	UJ	10	UJ		
TRICHLOROFLUOROMETHANE	10	UJ	10	U	10	UJ	10	UJ		
1,1-DICHLOROETHENE	10	U	10	U	10	U	10	U		
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	10	UJ	10	U	10	UJ	10	UJ		
ACETONE	10	U	10	U	10	U	10	U		
CARBON DISULFIDE	10	U	10	U	10	U	10	U		
METHYL ACETATE	10	U	10	U	10	U	10	U		
METHYLENE CHLORIDE	10	U	10	U	10	U	10	U		
TRANS-1,2-DICHLOROETHENE	10	U	10	U	10	U	10	U		
METHYL TERT-BUTYL ETHER	10	U	10	U	10	U	10	U		
1,1-DICHLOROETHANE	10	U	10	U	10	U	10	U		
CIS-1,2-DICHLOROETHENE	10	U	10	U	10	U	10	U		
2-BUTANONE	10	U	10	U	10	U	10	U		
CHLOROFORM	10	U	10	U	10	U	10	U		
1,1,1-TRICHLOROETHANE	10	U	10	U	10	U	10	U		
CYCLOHEXANE	10	U	10	U	10	U	10	U		
CARBON TETRACHLORIDE	10	U	10	U	10	U	10	U		
BENZENE	10	U	10	U	10	U	10	U		
1,2-DICHLOROETHANE	10	U	10	U	10	U	10	U		
TRICHLOROETHENE	10	U	10	U	10	U	10	U		
METHYLCYCLOHEXANE	10	U	10	U	10	U	10	U		
1,2-DICHLOROPROPANE	10	U	10	U	10	U	10	U		
BROMODICHLOROMETHANE	10	U	10	U	10	U	10	U		
CIS-1,3-DICHLOROPROPENE	10	U	10	U	10	U	10	U		
4-METHYL-2-PENTANONE	10	U	10	U	10	U	10	U		
TOLUENE	10	U	10	U	10	U	10	U		
TRANS-1,3-DICHLOROPROPENE	10	U	10	U	10	U	10	U		
1,1,2-TRICHLOROETHANE	10	U	10	U	10	U	10	U		
TETRACHLOROETHENE	10	U	10	U	10	U	10	U		

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1332		VBLKLQ		VBLKLR		VHBLK01			
Sampling Location :	TRIP BLANK									
Matrix :	Water		Water		Water		Water			
Units :	ug/L		ug/L		ug/L		ug/L			
Date Sampled :	6/22/2004									
Time Sampled :	12:00									
%Moisture :	N/A		N/A		N/A		N/A			
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0			
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-HEXANONE	10	U	10	U	10	U	10	U		
DIBROMOCHLOROMETHANE	10	U	10	U	10	U	10	U		
1,2-DIBROMOETHANE	10	U	10	U	10	U	10	U		
CHLOROBENZENE	10	U	10	U	10	U	10	U		
ETHYLBENZENE	10	U	10	U	10	U	10	U		
XYLENES (TOTAL)	10	U	10	U	10	U	10	U		
STYRENE	10	U	10	U	10	U	10	U		
BROMOFORM	10	U	10	U	10	U	10	U		
ISOPROPYLBENZENE	10	U	10	U	10	U	10	U		
1,1,2,2-TETRACHLOROETHANE	10	U	10	U	10	U	10	U		
1,3-DICHLOROBENZENE	10	U	10	U	10	U	10	U		
1,4-DICHLOROBENZENE	10	U	10	U	10	U	10	U		
1,2-DICHLOROBENZENE	10	U	10	U	10	U	10	U		
1,2-DIBROMO-3-CHLOROPROPANE	10	U	10	U	10	U	10	U		
1,2,4-TRICHLOROBENZENE	10	U	10	U	10	U	10	U		

Analytical Results (Qualified Data)

Case #: 33011
Site :
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Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Number of Soil Samples : 0
Number of Water Samples : 8

Sample Number :	E1289		E1289MS		E1289MSD		E1290		E1291	
Sampling Location :	SW-1		SW-1		SW-1		SW-2		SW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		10:10		10:15	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
PHENOL	10	U	34		32		10	U	10	U
BIS-(2-CHLOROETHYL)ETHER	10	U	10	U	10	U	10	U	10	U
2-CHLOROPHENOL	10	U	34		33		10	U	10	U
2-METHYLPHENOL	10	U	10	U	10	U	10	U	10	U
2,2'-OXYBIS(1- CHLOROPROPANE)	10	U	10	U	10	U	10	U	10	U
ACETOPHENONE	10	U	10	U	10	U	10	U	10	U
4-METHYLPHENOL	10	U	10	U	10	U	10	U	10	U
N-NITROSO-DI-N PROPYLAMINE	10	U	22		22		10	U	10	U
HEXACHLOROETHANE	10	U	10	U	10	U	10	U	10	U
NITROBENZENE	10	U	10	U	10	U	10	U	10	U
ISOPHORONE	10	U	10	U	10	U	10	U	10	U
2-NITROPHENOL	10	U	10	U	10	U	10	U	10	U
2,4-DIMETHYLPHENOL	10	U	10	U	10	U	10	U	10	U
BIS(2-CHLOROETHOXY)METHANE	10	U	10	U	10	U	10	U	10	U
2,4-DICHLOROPHENOL	10	U	10	U	10	U	10	U	10	U
NAPHTHALENE	10	U	10	U	10	U	10	U	10	U
4-CHLOROANILINE	10	U	10	U	10	U	10	U	10	U
HEXACHLOROBUTADIENE	10	U	10	U	10	U	10	U	10	U
CAPROLACTAM	10	U	10	U	10	U	10	U	10	U
4-CHLORO-3-METHYLPHENOL	10	U	40		38		10	U	10	U
2-METHYLNAPHTHALENE	10	U	10	U	10	U	10	U	10	U
HEXACHLOROCYCLO-PENTADIEN	10	U	10	U	10	U	10	U	10	U
2,4,6-TRICHLOROPHENOL	10	U	10	U	10	U	10	U	10	U
2,4,5-TRICHLOROPHENOL	25	U	25	U	25	U	25	U	25	U
1,1'-BIPHENYL	10	U	10	U	10	U	10	U	10	U
2-CHLORONAPHTHALENE	10	U	10	U	10	U	10	U	10	U
2-NITROANILINE	25	U	25	U	25	U	25	U	25	U
DIMETHYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
2,6-DINITROTOLUENE	10	U	10	U	10	U	10	U	10	U
ACENAPHTHYLENE	10	U	10	U	10	U	10	U	10	U
3-NITROANILINE	25	U	25	U	25	U	25	U	25	U
ACENAPHTHENE	10	U	23		23		10	U	10	U

DISCLAIMER: This package has been electronically assessed as an added service to our customer. It has not been either validated or approved by Region 5 and any subsequent use by the data user is strictly at the risk of the data user. Region 5 assumes no responsibility for use of unvalidated data.

Analytical Results (Qualified Data)

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1289		E1289MS		E1289MSD		E1290		E1291	
Sampling Location :	SW-1		SW-1		SW-1		SW-2		SW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		10:10		10:15	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	25	U	25	U	25	U	25	U	25	U
4-NITROPHENOL	25	U	38		38		25	U	25	U
DIBENZOFURAN	10	U	10	U	10	U	10	U	10	U
2,4-DINITROTOLUENE	10	U	25		25		10	U	10	U
DIETHYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
FLUORENE	10	U	10	U	10	U	10	U	10	U
4-CHLOROPHENYL-PHENYL ETHE	10	U	10	U	10	U	10	U	10	U
4-NITROANILINE	25	U	25	U	25	U	25	U	25	U
4,6-DINITRO-2-METHYLPHENOL	25	U	25	U	25	U	25	U	25	U
N-NITROSO DIPHENYLAMINE	10	U	10	U	10	U	10	U	10	U
4-BROMOPHENYL-PHENYLETHER	10	U	10	U	10	U	10	U	10	U
HEXACHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
ATRAZINE	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
PENTACHLOROPHENOL	25	U	44		44		25	U	25	U
PHENANTHRENE	10	U	10	U	10	U	10	U	10	U
ANTHRACENE	10	U	10	U	10	U	10	U	10	U
CARBAZOLE	10	U	10	U	10	U	10	U	10	U
DI-N-BUTYLPHTHALATE	1	J	10	U	3	J	10	U	10	U
FLUORANTHENE	10	U	10	U	10	U	10	U	10	U
PYRENE	10	U	29		31		10	U	10	U
BUTYLBENZYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
3,3'-DICHLOROBENZIDINE	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
BENZO(A)ANTHRACENE	10	U	10	U	10	U	10	U	10	U
CHRYSENE	10	U	10	U	10	U	10	U	10	U
BIS(2-ETHYLHEXYL)PHTHALATE	2	J	10	U	7	J	6	J	3	J
DI-N-OCTYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
BENZO(B)FLUORANTHENE	10	U	10	U	10	U	10	U	10	U
BENZO(K)FLUORANTHENE	10	U	10	U	10	U	10	U	10	U
BENZO(A)PYRENE	10	U	10	U	10	U	10	U	10	U
INDENO(1,2,3-CD)-PYRENE	10	U	10	U	10	U	10	U	10	U
DIBENZO(A,H)-ANTHRACENE	10	U	10	U	10	U	10	U	10	U
BENZO(G,H,I)PERYLENE	10	U	10	U	10	U	10	U	10	U

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	E1292		E1293		E1294		E1295		E1296	
Sampling Location :	SW-4		SW-5		SW-6		SW-7		SW-8	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	11:45		11:20		12:00		12:15		12:40	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
PHENOL	10	U	10	U	10	U	10	U	10	U
BIS-(2-CHLOROETHYL)ETHER	10	U	10	U	10	U	10	U	10	U
2-CHLOROPHENOL	10	U	10	U	10	U	10	U	10	U
2-METHYLPHENOL	10	U	10	U	10	U	10	U	10	U
2,2'-OXYBIS(1- CHLOROPROPANE)	10	U	10	U	10	U	10	U	10	U
ACETOPHENONE	10	U	10	U	10	U	10	U	10	U
4-METHYLPHENOL	10	U	10	U	10	U	10	U	10	U
N-NITROSO-DI-N PROPYLAMINE	10	U	10	U	10	U	10	U	10	U
HEXACHLOROETHANE	10	U	10	U	10	U	10	U	10	U
NITROBENZENE	10	U	10	U	10	U	10	U	10	U
ISOPHORONE	10	U	10	U	10	U	10	U	10	U
2-NITROPHENOL	10	U	10	U	10	U	10	U	10	U
2,4-DIMETHYLPHENOL	10	U	10	U	10	U	10	U	10	U
BIS(2-CHLOROETHOXY)METHANE	10	U	10	U	10	U	10	U	10	U
2,4-DICHLOROPHENOL	10	U	10	U	10	U	10	U	10	U
NAPHTHALENE	10	U	10	U	10	U	10	U	10	U
4-CHLOROANILINE	10	U	10	U	10	U	10	U	10	U
HEXACHLOROBUTADIENE	10	U	10	U	10	U	10	U	10	U
CAPROLACTAM	10	U	10	U	10	U	10	U	10	U
4-CHLORO-3-METHYLPHENOL	10	U	10	U	10	U	10	U	10	U
2-METHYLNAPHTHALENE	10	U	10	U	10	U	10	U	10	U
HEXACHLOROCYCLO-PENTADIEN	10	U	10	U	10	U	10	U	10	U
2,4,6-TRICHLOROPHENOL	10	U	10	U	10	U	10	U	10	U
2,4,5-TRICHLOROPHENOL	25	U	25	U	25	U	25	U	25	U
1,1'-BIPHENYL	10	U	10	U	10	U	10	U	10	U
2-CHLORONAPHTHALENE	10	U	10	U	10	U	10	U	10	U
2-NITROANILINE	25	U	25	U	25	U	25	U	25	U
DIMETHYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
2,6-DINITROTOLUENE	10	U	10	U	10	U	10	U	10	U
ACENAPHTHYLENE	10	U	10	U	10	U	10	U	10	U
3-NITROANILINE	25	U	25	U	25	U	25	U	25	U
ACENAPHTHENE	10	U	10	U	10	U	10	U	10	U

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Analytical Results (Qualified Data)

Case #: 33011
SDG : E1289
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1292		E1293		E1294		E1295		E1296	
Sampling Location :	SW-4		SW-5		SW-6		SW-7		SW-8	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	11:45		11:20		12:00		12:15		12:40	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	25	U	25	U	25	U	25	U	25	U
4-NITROPHENOL	25	U	25	U	25	U	25	U	25	U
DIBENZOFURAN	10	U	10	U	10	U	10	U	10	U
2,4-DINITROTOLUENE	10	U	10	U	10	U	10	U	10	U
DIETHYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
FLUORENE	10	U	10	U	10	U	10	U	10	U
4-CHLOROPHENYL-PHENYL ETHE	10	U	10	U	10	U	10	U	10	U
4-NITROANILINE	25	U	25	U	25	U	25	U	25	U
4,6-DINITRO-2-METHYLPHENOL	25	U	25	U	25	U	25	U	25	U
N-NITROSO DIPHENYLAMINE	10	U	10	U	10	U	10	U	10	U
4-BROMOPHENYL-PHENYLETHER	10	U	10	U	10	U	10	U	10	U
HEXACHLOROBENZENE	10	U	10	U	10	U	10	U	10	U
ATRAZINE	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
PENTACHLOROPHENOL	25	U	25	U	25	U	25	U	25	U
PHENANTHRENE	10	U	10	U	10	U	10	U	10	U
ANTHRACENE	10	U	10	U	10	U	10	U	10	U
CARBAZOLE	10	U	10	U	10	U	10	U	10	U
DI-N-BUTYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
FLUORANTHENE	10	U	10	U	10	U	10	U	10	U
PYRENE	10	U	10	U	10	U	10	U	10	U
BUTYLBENZYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
3,3'-DICHLOROBENZIDINE	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
BENZO(A)ANTHRACENE	10	U	10	U	10	U	10	U	10	U
CHRYSENE	10	U	10	U	10	U	10	U	10	U
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	10	U	10	U	10	U	2	J
DI-N-OCTYLPHTHALATE	10	U	10	U	10	U	10	U	10	U
BENZO(B)FLUORANTHENE	10	U	10	U	10	U	10	U	10	U
BENZO(K)FLUORANTHENE	10	U	10	U	10	U	10	U	10	U
BENZO(A)PYRENE	10	U	10	U	10	U	10	U	10	U
INDENO(1,2,3-CD)-PYRENE	10	U	10	U	10	U	10	U	10	U
DIBENZO(A,H)-ANTHRACENE	10	U	10	U	10	U	10	U	10	U
BENZO(G,H,I)PERYLENE	10	U	10	U	10	U	10	U	10	U

Case #: 33011
Site :
Lab. :
Reviewer :
Date :

SDG : E1289
BUCYRUS CITY DUMP
CEIMIC

Sample Number :	SBLKKA									
Sampling Location :										
Matrix :	Water									
Units :	ug/L									
Date Sampled :										
Time Sampled :										
%Moisture :	N/A									
pH :										
Dilution Factor :	1.0									
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
BENZALDEHYDE	10	UJ								
PHENOL	10	U								
BIS-(2-CHLOROETHYL)ETHER	10	U								
2-CHLOROPHENOL	10	U								
2-METHYLPHENOL	10	U								
2,2'-OXYBIS(1- CHLOROPROPANE)	10	U								
ACETOPHENONE	10	U								
4-METHYLPHENOL	10	U								
N-NITROSO-DI-N PROPYLAMINE	10	U								
HEXACHLOROETHANE	10	U								
NITROBENZENE	10	U								
ISOPHORONE	10	U								
2-NITROPHENOL	10	U								
2,4-DIMETHYLPHENOL	10	U								
BIS(2-CHLOROETHOXY)METHANE	10	U								
2,4-DICHLOROPHENOL	10	U								
NAPHTHALENE	10	U								
4-CHLOROANILINE	10	U								
HEXACHLOROBUTADIENE	10	U								
CAPROLACTAM	10	U								
4-CHLORO-3-METHYLPHENOL	10	U								
2-METHYLNAPHTHALENE	10	U								
HEXACHLOROCYCLO-PENTADIENE	10	U								
2,4,6-TRICHLOROPHENOL	10	U								
2,4,5-TRICHLOROPHENOL	25	U								
1,1'-BIPHENYL	10	U								
2-CHLORONAPHTHALENE	10	U								
2-NITROANILINE	25	U								
DIMETHYLPHTHALATE	10	U								
2,6-DINITROTOLUENE	10	U								
ACENAPHTHYLENE	10	U								
3-NITROANILINE	25	U								
ACENAPHTHENE	10	U								

Case #: 33011 SDG : E1289
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	SBLKKA									
Sampling Location :										
Matrix :	Water									
Units :	ug/L									
Date Sampled :										
Time Sampled :										
%Moisture :	N/A									
pH :										
Dilution Factor :	1.0									
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-DINITROPHENOL	25	U								
4-NITROPHENOL	25	U								
DIBENZOFURAN	10	U								
2,4-DINITROTOLUENE	10	U								
DIETHYLPHTHALATE	10	U								
FLUORENE	10	U								
4-CHLOROPHENYL-PHENYL ETHE	10	U								
4-NITROANILINE	25	U								
4,6-DINITRO-2-METHYLPHENOL	25	U								
N-NITROSO DIPHENYLAMINE	10	U								
4-BROMOPHENYL-PHENYLETHER	10	U								
HEXACHLOROBENZENE	10	U								
ATRAZINE	10	UJ								
PENTACHLOROPHENOL	25	U								
PHENANTHRENE	10	U								
ANTHRACENE	10	U								
CARBAZOLE	10	U								
DI-N-BUTYLPHTHALATE	10	U								
FLUORANTHENE	10	U								
PYRENE	10	U								
BUTYLBENZYLPHTHALATE	10	U								
3,3'-DICHLOROBENZIDINE	10	UJ								
BENZO(A)ANTHRACENE	10	U								
CHRYSENE	10	U								
BIS(2-ETHYLHEXYL)PHTHALATE	10	U								
DI-N-OCTYLPHTHALATE	10	U								
BENZO(B)FLUORANTHENE	10	U								
BENZO(K)FLUORANTHENE	10	U								
BENZO(A)PYRENE	10	U								
INDENO(1,2,3-CD)-PYRENE	10	U								
DIBENZO(A,H)-ANTHRACENE	10	U								
BENZO(G,H,I)PERYLENE	10	U								

Analytical Results (Qualified Data)

Case #: 33011 SDG : E1289
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Number of Soil Samples : 0
Number of Water Samples : 8

Sample Number :	E1289		E1289MS		E1289MSD		E1290		E1291	
Sampling Location :	SW-1		SW-1		SW-1		SW-2		SW-3	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		09:05		09:05		10:10		10:15	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
BETA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
DELTA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
GAMMA-BHC (LINDANE)	0.050	U	0.44		0.46		0.050	U	0.050	U
HEPTACHLOR	0.050	U	0.36		0.37		0.050	U	0.050	U
ALDRIN	0.050	U	0.47		0.48		0.050	U	0.050	U
HEPTACHLOR EPOXIDE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
ENDOSU1FAN I	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
DIELDRIN	0.10	U	0.90		0.92		0.10	U	0.10	U
4,4'-DDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDRIN	0.10	U	0.89		0.91		0.10	U	0.10	U
ENDOSULFAN II	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDD	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDOSULFAN SULFATE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDT	0.10	U	0.86		0.89		0.10	U	0.10	U
METHOXYCHLOR	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
ENDRIN KETONE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDRIN ALDEHYDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ALPHA-CHLORDANE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
GAMMA-CHLORDANE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
TOXAPHENE	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
AROCLOR-1016	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1221	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
AROCLOR-1232	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1242	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1248	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1254	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1260	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Analytical Results (Qualified Data)

Case #: 33011 SDG : E1289
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	E1292		E1293		E1294		E1295		E1296	
Sampling Location :	SW-4		SW-5		SW-6		SW-7		SW-8	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	11:45		11:20		12:00		12:15		12:40	
%Moisture :	N/A		N/A		N/A		N/A		N/A	
pH :										
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
BETA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
DELTA-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
GAMMA-BHC (LINDANE)	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
HEPTACHLOR	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
ALDRIN	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
HEPTACHLOR EPOXIDE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
ENDOSU1FAN I	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
DIELDRIN	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDRIN	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDOSULFAN II	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDD	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDOSULFAN SULFATE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDT	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
METHOXYCHLOR	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
ENDRIN KETONE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ENDRIN ALDEHYDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
ALPHA-CHLORDANE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
GAMMA-CHLORDANE	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
TOXAPHENE	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
AROCLOR-1016	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1221	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
AROCLOR-1232	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1242	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1248	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1254	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
AROCLOR-1260	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

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Analytical Results (Qualified Data)

Case #: 33011 SDG : E1289
Site : BUCYRUS CITY DUMP
Lab. : CEIMIC
Reviewer :
Date :

Sample Number :	PBLK01									
Sampling Location :										
Matrix :	Water									
Units :	ug/L									
Date Sampled :										
Time Sampled :										
%Moisture :	N/A									
pH :										
Dilution Factor :	1.0									
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALPHA-BHC	0.050	U								
BETA-BHC	0.050	U								
DELTA-BHC	0.050	U								
GAMMA-BHC (LINDANE)	0.050	U								
HEPTACHLOR	0.050	U								
ALDRIN	0.050	U								
HEPTACHLOR EPOXIDE	0.050	U								
ENDOSU1FAN I	0.050	U								
DIELDRIN	0.10	U								
4,4'-DDE	0.10	U								
ENDRIN	0.10	U								
ENDOSULFAN II	0.10	U								
4,4'-DDD	0.10	U								
ENDOSULFAN SULFATE	0.10	U								
4,4'-DDT	0.10	U								
METHOXYCHLOR	0.50	U								
ENDRIN KETONE	0.10	U								
ENDRIN ALDEHYDE	0.10	U								
ALPHA-CHLORDANE	0.050	U								
GAMMA-CHLORDANE	0.050	U								
TOXAPHENE	5.0	U								
AROCLOR-1016	1.0	U								
AROCLOR-1221	2.0	U								
AROCLOR-1232	1.0	U								
AROCLOR-1242	1.0	U								
AROCLOR-1248	1.0	U								
AROCLOR-1254	1.0	U								
AROCLOR-1260	1.0	U								

Analytical Results (Qualified Data)

Case #: 33011 SDG : ME1289
Site : BUCYRUS CITY DUMP
Lab. : BONNER
Reviewer :
Date :

Number of Soil Samples : 0
Number of Water Samples : 8

Sample Number :	ME1289		ME1290		ME1291		ME1292		ME1293	
Sampling Location :	SW-1		SW-2		SW-3		SW-4		SW-5	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	09:05		10:10		10:15		11:45		11:20	
%Solids :	0.0		0.0		0.0		0.0		0.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	2190	J	282	J	179	J	1410	J	1250	J
ANTIMONY	60.0	U	60.0	U	60.0	U	60.0	U	60.0	U
ARSENIC	10.0	U	10.0	U	2.5	J	2.9	J	4.4	J
BARIUM	74.8	J	63.1	J	59.8	J	69.3	J	69.6	J
BERYLLIUM	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
CADMIUM	0.58	J	5.0	U	5.0	U	0.47	J	5.0	U
CALCIUM	76800		99600		96000		76400		77500	
CHROMIUM	2.1	J	10.0	U	10.0	U	1.5	J	1.5	J
COBALT	0.79	J	50.0	U	50.0	U	1.2	J	50.0	U
COPPER	3.6	J	3.1	J	2.2	J	3.3	J	3.6	J
IRON	1940	J	490	J	303	J	1900	J	1710	J
LEAD	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
MAGNESIUM	20100		29800		28700		20100		20200	
MANGANESE	47.9	J	66.2	J	47.5	J	49.3	J	45.1	J
MERCURY	0.20	U	0.20	U	0.050	J+	0.20	UJ	0.22	J+
NICKEL	2.9	J	3.6	J	3.4	J	3.1	J	2.4	J
POTASSIUM	4770	J	5470	J	5350	J	4240	J	4270	J
SELENIUM	35.0	U	35.0	U	35.0	U	35.0	U	35.0	U
SILVER	10.0	U	10.0	U	10.0	U	0.73	J	10.0	U
SODIUM	17000		25400		24100		16500		16900	
THALLIUM	25.0	U	25.0	U	25.0	U	25.0	U	25.0	U
VANADIUM	5.3	J	50.0	U	0.95	J	3.8	J	3.4	J
ZINC	8.4	J	3.2	J	2.5	J	8.8	J	7.4	J
CYANIDE	10.0	U	10.9		11.2		10.0	U	10.0	U

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Analytical Results (Qualified Data)

Case #: 33011 SDG : ME1289
Site : BUCYRUS CITY DUMP
Lab. : BONNER
Reviewer :
Date :

Sample Number :	ME1294		ME1295		ME1296		ME1289D		ME1289S	
Sampling Location :	SW-6		SW-7		SW-8		SW-1		SW-1	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	6/22/2004		6/22/2004		6/22/2004		6/22/2004		6/22/2004	
Time Sampled :	12:00		12:15		12:40		09:05		09:05	
%Solids :	0.0		0.0		0.0		0.0		0.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	321	J	2770	J	267	J	2220		3350	
ANTIMONY	60.0	U	8.3	UJ	60.0	U	60.0	U	77.7	
ARSENIC	10.0	U	10.0	U	10.0	U	3.1	J	33.3	
BARIUM	116	J	139	J	19.2	J	73.1	J	1720	
BERYLLIUM	5.0	U	0.080	J	5.0	U	0.050	J	41.0	
CADMIUM	0.78	J	1.0	J	5.0	U	0.51	J	41.2	
CALCIUM	214000		123000		33100		75100		72900	
CHROMIUM	10.0	U	3.9	J	10.0	U	2.0	J	165	
COBALT	0.96	J	2.9	J	50.0	U	50.0	U	406	
COPPER	3.0	J	18.5	J	3.8	J	3.1	J	211	
IRON	9000	J	4630	J	333	J	1900		2670	
LEAD	4.3	J	91.2		10.0	U	10.0	U	17.3	
MAGNESIUM	67000		65600		12800		19700		18900	
MANGANESE	370	J	417	J	8.0	J	46.9		460	
MERCURY	0.21	J+	0.20	UJ	0.090	UJ	0.20	U	1.3	
NICKEL	7.9	J	10.4	J	2.1	J	4.0	J	411	
POTASSIUM	35400	J	20000	J	1240	J	4610	J	4270	J
SELENIUM	35.0	U	35.0	U	35.0	U	35.0	U	42.7	
SILVER	0.89	J	10.0	U	10.0	U	10.0	U	38.4	
SODIUM	41200		81300		23400		16300		16000	
THALLIUM	25.0	U	25.0	U	25.0	U	25.0	U	42.8	
VANADIUM	50.0	R	5.9	R	1.1	J	5.2	J	407	
ZINC	1240		132		3.3	J	8.9	J	414	
CYANIDE	10.0	U	10.0	U	10.0	U	10.0	U	93.3	

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APPENDIX H

SEDIMENT ANALYSIS DOCUMENTS

Attachment H
OHIO SPECIFIC SEDIMENT REFERENCE VALUES

INTRODUCTION

The decision to remediate potential contamination of an environmental medium (*e.g.*, air, soil, ground or surface water, sediments) on the basis of potential impacts to ecological receptors is based in part, upon the concentration of the chemical(s) in the medium. In the case of evaluating impacts to sediments, one option is to demonstrate that the chemical concentrations may be acceptable using toxicological benchmark screening values. However, these are often not directly associated with ecological integrity.

The utility of these benchmarks is somewhat limited for several reasons. Generally, these benchmarks are developed based on potential adverse affects to a variety of organisms using bioassays, receptor intake modeling (exposure models using toxicity threshold criteria and hazard quotient methodologies), or, more rarely, measured responses in actual contaminated environments. If the benchmark values are based on bioassays, then often pollutant tolerant species were used due to their ability to survive and reproduce in captivity or laboratory environments. It is also likely that the organisms used in the development of the conservative benchmark values may not be associated with the site. In addition, many of these benchmark values are applied regardless of the specific media characteristics or regional differences associated with the development of the benchmark values.

A second option is to compare chemical concentrations in potentially impacted sediments to background levels derived from non- or minimally impacted locations. In the context of this communication, background is defined as the concentration of naturally occurring chemicals that are unaffected by any current or past activities involving the management, handling, treatment, storage, or disposal of chemicals. The use of background concentrations of chemicals in identifying potential contamination has been a common practice and, although most regulatory agencies allow the screening of potentially contaminated media based on background conditions, the development of site-specific background concentrations is limited due the number of samples and associated costs often required to permit a statistically relevant estimation of background.

As a potential resource and cost effective alternative to the latter approach, Ohio-specific Sediment Reference Values (SRVs) were developed to identify representative background sediment concentrations for lotic (flowing) water bodies. The SRVs will more conclusively identify whether a site has been contaminated, as reliable background values can be used to identify if sediments have concentrations of chemicals above a level considered to be representative of the area. The ability to develop background sediment concentrations including regional differences in Ohio were based on the sediment sampling conducted at biological reference sites. These reference sites were the same sites used in the development of biological criteria in Ohio.

Biological Criteria and Reference Areas

Biological criteria are narrative and measurable attributes of aquatic communities. These attributes include macroinvertebrate and fish community structure and function combined with habitat evaluations (Yoder and Rankin, 1996). In Ohio, numerical biological criteria were developed using a regional reference site approach (Ohio EPA 1987a,b; Ohio EPA 1989; Yoder 1989; Yoder and Rankin 1995). The development of the SRVs also used the same regional approach as the data used in the development of the biological criteria, with sediment and biological sites often co-occurring (Figure 1).

Sediment samples were taken from reference areas throughout the state that have been used historically to develop the biological criteria as part of the State of Ohio's water quality standards. These reference areas were selected as being representative of least impacted conditions in the watersheds for which they serve as models. In Ohio, parts of five ecoregions occur (Figure 1). An ecoregion is a relatively homogenous area where boundaries of several key geographic variables more or less coincide (Hughes et al. 1986). In using the ecoregion/reference site approach the reference sites serve as benchmarks for measuring the condition of other sites within the same ecoregion (Ohio EPA 1987b).

Materials and Methods

Sample collection

Sediment data was collected from lotic Ohio surface water bodies in all five ecoregions from approximately

1984 through 2001. Sediments were sampled in accordance with Ohio EPA sediment sampling guidelines (Ohio EPA 2001) which specify that samples be taken, when possible, in sediment deposition zones. A majority of these samples were taken as part of the Ohio EPA surface water program to assess water resource conditions in rivers and streams of Ohio. In addition, sediment samples collected as part of Division of Emergency and Remedial Response's site assessments (co-occurring at biological reference sites) and the Lake Erie watershed biological reference site sediment characterization project (Ohio EPA 1999a) were included. A total of 512 bulk sediment chemistry results were used in this analysis.

Laboratory analysis
Chemical analysis of the sediments was performed using methodologies summarized in Table 1. Specific analysis to determine metal speciation were not conducted.

Table 1: Summary of analytical methodologies[1]

Analytical technique	USEPA Methodology
Graphite furnace atomic absorption spectrometry (GFAA)	USEPA 7041, 7060A, 7131A, 7421, 7740, 7760A, 7841,
Cold vapor atomic absorption spectrophotometry - (CVAA)	USEPA 7471A, 245.5
Inductively coupled plasma-atomic emission spectrometry (ICP-AES)	USEPA 6110B
Stabilized temperature GFAA	USEPA 200.15

[1] All methods listed are SW-846 (excluding USEPA 245.5 and 200.15)

Sediment chemical concentrations were reported on a bulk dry-weight basis. Dry-weight data were used as previous studies regarding predictive toxicity -based values indicate that they predict effects as well or better than values that are based on carbon-normalized data. (Barrick et al. 1988; Long et al. 1995; Ingersoll et al. 1996; U.S. EPA 1996a; MacDonald 1997).

Data consisted of single discrete chemical samples and samples taken for quality assurance and quality control (QA/QC) purposes. Data from individual samples were used "as is." Data derived from field split samples were averaged between the splits. This was based on the fact that split samples were duplicate aliquots taken from the same mixed sample. Field split samples were collected to verify field compositing techniques and sediment homogeneity within a single collected sample (Ohio EPA 2001). In contrast, station replicate samples were completely separate QA/QC samples. However, these station replicates were taken in the same general vicinity as the sample of interest. Replicate samples can be collected to determine the variability of the concentrations of chemicals in the sediment at a specific site and/or as an assessment of a field sampling technique. Based on the above, replicate data points were considered as discrete values in the development of the SRVs.

Treatment of Detection Limits
In evaluating any environmental dataset the presence of numerous detection limits can complicate its statistical analysis, due to the clustering of single values often at or near the lower extreme of the data range. Because these data represent actual, albeit somewhat uncertain quantitative data, but also include, in general, the lowest sample concentrations, their inclusion in a complete analysis is critical. The usual approach to dealing with detection limits is to use either the detection limit itself, or some constant fraction (e.g. 0.5 or 0.1) of the detection limit. Because this approach does not relieve the issue of data clustering, an alternative approach to evaluating detection limits was employed.

Given that a detection limit represents the theoretical maximum concentration that could be measured in a specific sample, the true sample concentration is a value somewhere between 0 and the detection limit. The probability that the actual value approximates any specific value within that range is equal for all values in the range. That is, if a random number between 0 and the detection limit were chosen, the likelihood that it would be a better or worse representation of the actual value than 0, the detection limit itself, or any fraction of the detection limit is the same. The advantage in choosing a random number however, is that while it has the same level of uncertainty as choosing a value such as 0.5 times the detection limit to represent the true concentration, the likelihood of drawing the same number for each occurrence of a detection limit is quite small. Thus distributional issues due to clustering at a single value, as well as inappropriate statistical bias to a particular value as a better representation of the true value is eliminated. The importance of using this approach increases as the percentage of concentrations reported as detection limits increases.

A second issue regarding detection limits is related to samples in which high detection limits are reported. In these cases, it was assumed that sample conditions were such that an accurate measurement of a specific constituent could not be made. Therefore, as an initial screen, all detection limits were evaluated in the context of maximum measured concentrations for each constituent. In instances where the detection limit exceeded the maximum measured concentration for a specific analyte, the sample was excluded for that particular analyte. Detection limits passing this criterion were included in the evaluation as a random number between 0 and the detection limit.

Statistical Analysis
Once all detection limits had been adjusted as noted above, the data were first evaluated for underlying distributions (normal or lognormal) using probability plots of original and transformed data. Results of this analysis indicated that in most cases, the data were neither normally nor lognormally distributed. This was confirmed using a Komolgorov/Smirnov nonparametric test for normality.

Based upon this finding, individual constituents grouped by ecoregion were evaluated in order to determine whether significant differences existed between concentrations observed in each ecoregion. Because the data were not normally distributed a nonparametric Kruskal-Wallace test was used in lieu of a standard one-way analysis of variance. Based upon this evaluation, most constituents exhibited significant differences ($p < 0.05$) among concentrations observed at one or more ecoregions. In those cases where no significant differences were observed, a single statewide reference value was derived. In instances where a significant difference was observed, individual reference values were calculated for each ecoregion.

In some instances, insufficient data ($n<12$) precluded derivation of either an ecoregion-specific reference value, or determination of whether or not a statewide value would accurately reflect concentrations for a specific ecoregion. In those instances no value is provided and it is recommended that site-specific background concentrations for these specific constituents be developed on a case-by-case basis.

Derivation of SRVs
Once it was determined that a statewide or ecoregion value should be developed, the data were pooled for each constituent as appropriate and a representative value was derived. The derivation and use of an upper-bound confidence limit of a defined sample quantile (e.g. 90th percentile) as an appropriate representation of the background population was precluded because the data could not, in general, be fit to an underlying distribution. As an alternative approach, the value was derived as a cutoff value, above which a value would be considered an outlier (Ohio EPA1999b). Using this technique, the reference value was defined as the interquartile range (distance between the 25th and 75th percentile) multiplied by 1.5 and added to the upper quartile (75th percentile) value. This value is consistent with the upper inner fence on a standard box plot.

Results

The SRVs given in Table 2 may be used in conjunction with, or in lieu of, generating site-specific background concentrations to determine whether sediments have been potentially impacted by site-related activities. As mentioned above, it should be noted that the SRVs ***are not*** Ohio EPA standards or criteria. The values are to be used as a screening tool for sites that have identified potential sediment contamination in lotic waterbodies. Where indicated, ecoregion specific values are provided and are appropriate for sites within that ecoregion (see Figure 1 for ecoregion boundaries and abbreviations).

Table 2: Sediment Reference Values (mg/kg)

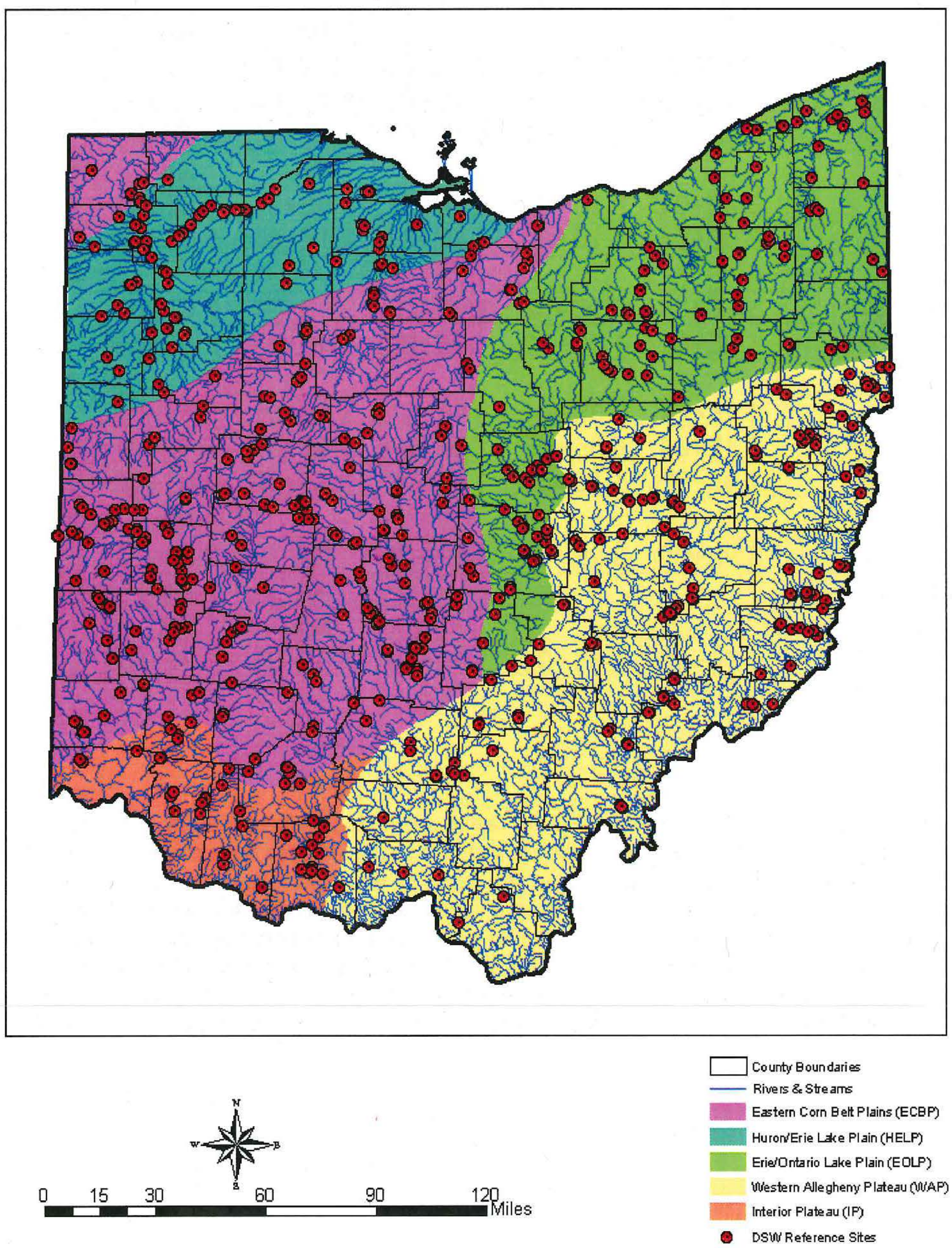
	ECBP	EOLP	HELP	IP	WAP	Statewide
aluminum	3.9E+04	2.9E+04	4.2E+04	2.8E+04	5.3E+04	
antimony	9.2E-01	1.3E+00	8.4E-01	**NA**[1]	**NA**	
arsenic	1.8E+01	2.5E+01	1.1E+01	1.1E+01	1.9E+01	
barium	2.4E+02	1.9E+02	2.1E+02	1.7E+02	3.6E+02	
beryllium				**NA**	**NA**	8.0E-01
cadmium	9.0E-01	7.9E-01	9.6E-01	3.0E-01	8.0E-01	
calcium	1.2E+05	2.1E+04	1.1E+05	9.4E+04	2.7E+04	
chromium	4.0E+01	2.9E+01	5.1E+01	3.0E+01	5.3E+01	
cobalt				**NA**	**NA**	1.2E+01
copper	3.4E+01	3.2E+01	4.2E+01	2.5E+01	3.3E+01	
iron	3.3E+04	4.1E+04	4.4E+04	3.1E+04	5.1E+04	
lead						4.7E+01
magnesium	3.5E+04	7.1E+03	2.9E+04	2.0E+04	9.9E+03	
manganese	7.8E+02	1.5E+03	1.0E+03	1.4E+03	3.0E+03	
mercury						1.2E-01
nickel	4.2E+01	3.3E+01	3.6E+01	3.3E+01	6.1E+01	
potassium	1.1E+04	6.8E+03	1.2E+04	5.9E+03	1.4E+04	
selenium	2.3E+00	1.7E+00	1.4E+00	1.6E+00	2.6E+00	
silver[2]					**NA**	4.3E-01
strontium	3.9E+02	6.2E+01	2.5E+02	**NA**	2.5E+02	
thallium				**NA**	**NA**	4.7E+00
vanadium				**NA**	**NA**	4.0E+01
zinc	1.6E+02	1.6E+02	1.9E+02	1.0E+02	1.7E+02	

The maximum sediment concentration value for each constituent detected in lotic sediments is to be compared to the appropriate SRV. If the maximum detected value is less than the SRV, then the constituent may be eliminated from further consideration in the aquatic ecological risk assessment. If all site-related constituents are below the appropriate SRVs, then it is considered that the site did not impact the sediments in question. Other qualitative evaluations (*e.g.*, site sediments approximate background conditions, lentic sediment evaluations) may also be made using the SRVs, however, these evaluations should be discussed and approved prior to the submission of any risk assessment reports. Constituents without SRVs are to be retained for further evaluation or compared to site-specific background values identified from upstream sediment concentrations.

[1]Not Applicable

[2]Value for silver was derived as indicated, however a judgement regarding the validity of the maximum concentration related to data from a single laboratory resulted in removal of the data point. As a result, several elevated detection limits from the same laboratory were removed based upon application of this decision rather than on the basis of exceeding the highest measured concentration.

Figure 1: Division of Surface Water Sampling Locations and Ohio Ecoregions



REFERENCES

Barrick R, Becker S, Pastorok R, Brown L, Beller H (1988) Sediment quality values refinement: 1988 update and evaluation of Puget Sound AET. Prepared by PTI Environmental Services for Environmental Protection Agency, Bellevue, WA.

Hughes, R.M., D.P. Larsen, and J.M. Omernik (1986) Regional reference sites: a method for assessing stream pollution. Env. Mgmt. 10 (5): 629-635.

Ingersoll CG, Haverland PS, Brunson EL, Canfield TJ, Dwyer FJ, Henke CE, Kemble NE, Mount DR, Fox RG (1996) Calculation and evaluation of sediment effect concentrations for the amphipod *Hyalella azteca* and midge *Chironomus riparius.* J Great Lakes Res 22:602-623.

Long ER, MacDonald DD, Smith SL, Calder FD (1995) Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environ Manage 19:81-97.

MacDonald DD (1997) Sediment injury in the Southern California Bight: review of the toxic effects of DDTs and PCBs in sediments. Prepared for National Oceanic and Atmospheric Administration, US Department of Commerce, Long Beach CA.

Ohio EPA (2001) Sediment Sampling Guide and Methodologies (2nd Edition). Division of Surface Water, Columbus OH.

Ohio EPA (1999a) Ohio EPA/Heidelberg College Lake Erie Basin Sediment Project Report, Columbus, OH.

Ohio EPA (1999b) Closure Plan Review Guidance for RCRA Facilities. Division of Hazardous Waste Management, Columbus, OH.

Ohio EPA (1989) Ohio EPA manual of surveillance methods and quality assurance practices, updated edition. Division of Environmental Services, Columbus, Ohio.

Ohio EPA (1987a) Biological criteria for the protection of aquatic life: Volume I. The role of biological data in water quality assessment. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.

Ohio EPA (1987b) Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.

Yoder, C.O. (1989) The development and use of biological criteria for Ohio surface waters. U.S. EPA, Criteria and Standards Div., Water Quality Stds. 21st Century, 1989: 139-146.

Yoder, C.O. and E.T Rankin (1996) Assessing the condition and status of aquatic life designated uses in urban and suburban watersheds., pp.201-227. *in* Roesner, L.A. (ed). Effects of Watershed Development and Management on Aquatic Ecosystems, American Society of Civil Engineers, New York, NY.

Yoder, C.O. and E.T. Rankin. (1995) Biological criteria program development and implementation in Ohio, pp. 109-144. in W. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making. Lewis Publishers, Boca Raton, FL.

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Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems

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Abstract. Numerical sediment quality guidelines (SQGs) for freshwater ecosystems have previously been developed using a variety of approaches. Each approach has certain advantages and limitations which influence their application in the sediment quality assessment process. In an effort to focus on the agreement among these various published SQGs, consensus-based SQGs were developed for 28 chemicals of concern in freshwater sediments (*i.e.*, metals, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and pesticides). For each contaminant of concern, two SQGs were developed from the published SQGs, including a threshold effect concentration (TEC) and a probable effect concentration (PEC). The resultant SQGs for each chemical were evaluated for reliability using matching sediment chemistry and toxicity data from field studies conducted throughout the United States. The results of this evaluation indicated that most of the TECs (*i.e.*, 21 of 28) provide an accurate basis for predicting the absence of sediment toxicity. Similarly, most of the PECs (*i.e.*, 16 of 28) provide an accurate basis for predicting sediment toxicity. Mean PEC quotients were calculated to evaluate the combined effects of multiple contaminants in sediment. Results of the evaluation indicate that the incidence of toxicity is highly correlated to the mean PEC quotient ($R^2 = 0.98$ for 347 samples). It was concluded that the consensus-based SQGs provide a reliable basis for assessing sediment quality conditions in freshwater ecosystems.

Numerical sediment quality guidelines (SQGs; including sediment quality criteria, sediment quality objectives, and sediment quality standards) have been developed by various federal, state, and provincial agencies in North America for both freshwater and marine ecosystems. Such SQGs have been used in numerous applications, including designing monitoring programs, interpreting historical data, evaluating the need for detailed sediment quality assessments, assessing the quality of prospective dredged materials, conducting remedial investigations and ecological risk assessments, and developing sediment quality remediation objectives (Long and MacDonald 1998). Numerical SQGs have also been used by many scientists and managers to identify contaminants of concern in aquatic ecosystems and to rank areas of concern on a regional or national basis (*e.g.*, US EPA 1997a). It is apparent, therefore, that numerical SQGs, when used in combination with other tools, such as sediment toxicity tests, represent a useful approach for assessing the quality of freshwater and marine sediments (MacDonald *et al.* 1992; US EPA 1992, 1996a, 1997a; Adams *et al.* 1992; Ingersoll *et al.* 1996, 1997).

The SQGs that are currently being used in North America have been developed using a variety of approaches. The approaches that have been selected by individual jurisdictions depend on the receptors that are to be considered (*e.g.*, sediment-dwelling organisms, wildlife, or humans), the degree of protection that is to be afforded, the geographic area to which the values are intended to apply (*e.g.*, site-specific, regional, or national), and their intended uses (*e.g.*, screening tools, remediation objectives, identifying toxic and not-toxic samples, bioaccumulation assessment). Guidelines for assessing sediment quality relative to the potential for adverse effects on sediment-dwelling organisms in freshwater systems have been derived using a combination of theoretical and empirical approaches, primarily including the equilibrium partitioning approach (EqPA; Di Toro *et al.* 1991; NYSDEC 1994; US EPA 1997a), screening level concentration approach (SLCA; Persaud *et al.* 1993), effects range approach (ERA; Long and Morgan 1991; Ingersoll *et al.* 1996), effects level approach (ELA; Smith *et al.* 1996; Ingersoll *et al.* 1996), and apparent effects threshold approach (AETA; Cubbage *et al.* 1997). Application of these methods has resulted in the derivation of numerical SQGs for many chemicals of potential concern in freshwater sediments.

Selection of the most appropriate SQGs for specific applications can be a daunting task for sediment assessors. This task is particularly challenging because limited guidance is currently available on the recommended uses of the various SQGs. In addition, the numerical SQGs for any particular substance can differ by several orders of magnitude, depending on the derivation procedure and intended use. The SQG selection process is further complicated due to uncertainties regarding

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the bioavailability of sediment-associated contaminants, the effects of covarying chemicals and chemical mixtures, and the ecological relevance of the guidelines (MacDonald *et al.* 2000). It is not surprising, therefore, that controversies have occurred over the proper use of these sediment quality assessment tools.

This paper represents the third in a series that is intended to address some of the difficulties associated with the assessment of sediment quality conditions using various numerical SQGs. The first paper was focused on resolving the "mixture paradox" that is associated with the application of empirically derived SQGs for individual PAHs. In this case, the paradox was resolved by developing consensus SQGs for ΣPAHs (*i.e.*, total PAHs; Swartz 1999). The second paper was directed at the development and evaluation of consensus-based sediment effect concentrations for total PCBs, which provided a basis for resolving a similar mixture paradox for that group of contaminants using empirically derived SQGs (MacDonald *et al.* 2000). The results of these investigations demonstrated that consensus-based SQGs provide a unifying synthesis of the existing guidelines, reflect causal rather than correlative effects, and account for the effects of contaminant mixtures in sediment (Swartz 1999).

The purpose of this third paper is to further address uncertainties associated with the application of numerical SQGs by providing a unifying synthesis of the published SQGs for freshwater sediments. To this end, the published SQGs for 28 chemical substances were assembled and classified into two categories in accordance with their original narrative intent. These published SQGs were then used to develop two consensus-based SQGs for each contaminant, including a threshold effect concentration (TEC; below which adverse effects are not expected to occur) and a probable effect concentration (PEC; above which adverse effects are expected to occur more often than not). An evaluation of resultant consensus-based SQGs was conducted to provide a basis for determining the ability of these tools to predict the presence, absence, and frequency of sediment toxicity in field-collected sediments from various locations across the United States.

Materials and Methods

Derivation of the Consensus-Based SQGs

A stepwise approach was used to develop the consensus-based SQGs for common contaminants of concern in freshwater sediments. As a first step, the published SQGs that have been derived by various investigators for assessing the quality of freshwater sediments were collated. Next, the SQGs obtained from all sources were evaluated to determine their applicability to this study. To facilitate this evaluation, the supporting documentation for each of the SQGs was reviewed. The collated SQGs were further considered for use in this study if: (1) the methods that were used to derive the SQGs were readily apparent; (2) the SQGs were based on empirical data that related contaminant concentrations to harmful effects on sediment-dwelling organisms or were intended to be predictive of effects on sediment-dwelling organisms (*i.e.*, not simply an indicator of background contamination); and (3) the SQGs had been derived on a *de novo* basis (*i.e.*, not simply adopted from another jurisdiction or source). It was not the intent of this paper to collate bioaccumulation-based SQGs.

The SQGs that were expressed on an organic carbon–normalized basis were converted to dry weight–normalized values at 1% organic carbon (MacDonald *et al.* 1994, 1996; US EPA 1997a). The dry weight–normalized SQGs were utilized because the results of previous studies have shown that they predicted sediment toxicity as well or better than organic carbon–normalized SQGs in field-collected sediments (Barrick *et al.* 1988; Long *et al.* 1995; Ingersoll *et al.* 1996; US EPA 1996a; MacDonald 1997).

The effects-based SQGs that met the selection criteria were then grouped to facilitate the derivation of consensus-based SQGs (Swartz 1999). Specifically, the previously published SQGs for the protection of sediment-dwelling organisms in freshwater ecosystems were grouped into two categories according to their original narrative intent, including TECs and PECs. The TECs were intended to identify contaminant concentrations below which harmful effects on sediment-dwelling organisms were not expected. TECs include threshold effect levels (TELs; Smith *et al.* 1996; US EPA 1996a), effect range low values (ERLs; Long and Morgan 1991), lowest effect levels (LELs; Persaud *et al.* 1993), minimal effect thresholds (METs; EC and MENVIQ 1992), and sediment quality advisory levels (SQALs; US EPA 1997a). The PECs were intended to identify contaminant concentrations above which harmful effects on sediment-dwelling organisms were expected to occur frequently (MacDonald *et al.* 1996; Swartz 1999). PECs include probable effect levels (PELs; Smith *et al.* 1996; US EPA 1996a), effect range median values (ERMs; Long and Morgan 1991); severe effect levels (SELs; Persaud *et al.* 1993), and toxic effect thresholds (TETs; EC and MENVIQ 1992; Table 1).

Following classification of the published SQGs, consensus-based TECs were calculated by determining the geometric mean of the SQGs that were included in this category (Table 2). Likewise, consensus-based PECs were calculated by determining the geometric mean of the PEC-type values (Table 3). The geometric mean, rather than the arithmetic mean or median, was calculated because it provides an estimate of central tendency that is not unduly affected by extreme values and because the distributions of the SQGs were not known (MacDonald *et al.* 2000). Consensus-based TECs or PECs were calculated only if three of more published SQGs were available for a chemical substance or group of substances.

Evaluation of the SQGs

The consensus-based SQGs were critically evaluated to determine if they would provide effective tools for assessing sediment quality conditions in freshwater ecosystems. Specifically, the reliability of the individual or combined consensus-based TECs and PECs for assessing sediment quality conditions was evaluated by determining their predictive ability. In this study, predictive ability is defined as the ability of the various SQGs to correctly classify field-collected sediments as toxic or not toxic, based on the measured concentrations of chemical contaminants. The predictive ability of the SQGs was evaluated using a three-step process.

In the first step of the SQG evaluation process, matching sediment chemistry and biological effects data were compiled for various freshwater locations in the United States. Because the data sets were generated for a wide variety of purposes, each study was evaluated to assure the quality of the data used for evaluating the predictive ability of the SQGs (Long *et al.* 1998; Ingersoll and MacDonald 1999). As a result of this evaluation, data from the following freshwater locations were identified for use in this paper: Grand Calumet River and Indiana Harbor Canal, IN (Hoke *et al.* 1993; Giesy *et al.* 1993; Burton 1994; Dorkin 1994); Indiana Harbor, IN (US EPA 1993a, 1996a, 1996b); Buffalo River, NY (US EPA 1993c, 1996a); Saginaw River, MI (US EPA 1993b, 1996a); Clark Fork River, MT (USFWS 1993); Milltown Reservoir, MT (USFWS 1993); Lower Columbia River, WA (Johnson and Norton 1988); Lower Fox River and Green Bay, WI (Call *et al.* 1991); Potomac River, DC (Schlekat *et al.* 1994; Wade *et al.* 1994; Velinsky *et al.* 1994); Trinity River, TX (Dickson *et al.* 1989; US EPA 1996a); Upper Mississippi River, MN to MO (US EPA 1996a, 1997b);

Table 1. Descriptions of the published freshwater SQGs that have been developed using various approaches

Type of SQG	Acronym	Approach	Description	Reference
Threshold effect concentration SQGs				
Lowest effect level	LEL	SLCA	Sediments are considered to be clean to marginally polluted. No effects on the majority of sediment-dwelling organisms are expected below this concentration.	Persaud *et al.* (1993)
Threshold effect level	TEL	WEA	Represents the concentration below which adverse effects are expected to occur only rarely.	Smith *et al.* (1996)
Effect range—low	ERL	WEA	Represents the chemical concentration below which adverse effects would be rarely observed.	Long and Morgan (1991)
Threshold effect level for *Hyalella azteca* in 28-day tests	TEL-HA28	WEA	Represents the concentration below which adverse effects on survival or growth of the amphipod *Hyalella azteca* are expected to occur only rarely (in 28-day tests).	US EPA (1996a); Ingersoll *et al.* (1996)
Minimal effect threshold	MET	SLCA	Sediments are considered to be clean to marginally polluted. No effects on the majority of sediment-dwelling organisms are expected below this concentration.	EC and MENVIQ (1992)
Chronic equilibrium partitioning threshold	SQAL	EqPA	Represents the concentration in sediments that is predicted to be associated with concentrations in the interstitial water below a chronic water quality criterion. Adverse effects on sediment-dwelling organisms are predicted to occur only rarely below this concentration.	Bolton *et al.* (1985); Zarba (1992); US EPA (1997a)
Probable effect concentration SQGs				
Severe effect level	SEL	SLCA	Sediments are considered to be heavily polluted. Adverse effects on the majority of sediment-dwelling organisms are expected when this concentration is exceeded.	Persaud *et al.* (1993)
Probable effect level	PEL	WEA	Represents the concentration above which adverse effects are expected to occur frequently.	Smith *et al.* (1996)
Effect range—median	ERM	WEA	Represents the chemical concentration above which adverse effects would frequently occur.	Long and Morgan (1991)
Probable effect level for *Hyalella azteca* in 28-day tests	PEL-HA28	WEA	Represents the concentration above which adverse effects on survival or growth of the amphipod *Hyalella azteca* are expected to occur frequently (in 28-day tests).	US EPA (1996a); Ingersoll *et al.* (1996)
Toxic effect threshold	TET	SLCA	Sediments are considered to be heavily polluted. Adverse effects on sediment-dwelling organisms are expected when this concentration is exceeded.	EC and MENVIQ (1992)

and Waukegan Harbor, IL (US EPA 1996a; Kemble *et al.* 1999). These studies provided 17 data sets (347 sediment samples) with which to evaluate the predictive ability of the SQGs. These studies also represented a broad range in both sediment toxicity and contamination; roughly 50% of these samples were found to be toxic based on the results of the various toxicity tests (the raw data from these studies are summarized in Ingersoll and MacDonald 1999).

In the second step of the evaluation, the measured concentration of each substance in each sediment sample was compared to the corresponding SQG for that substance. Sediment samples were predicted to be not toxic if the measured concentrations of a chemical substance were lower than the corresponding TEC. Similarly, samples were predicted to be toxic if the corresponding PECs were exceeded in field-collected sediments. Samples with contaminant concentrations between the TEC and PEC were neither predicted to be toxic nor nontoxic (*i.e.*, the individual SQGs are not intended to provide guidance within this range of concentrations). The comparisons of measured concentrations to the SQGs were conducted for each of the 28 chemicals of concern for which SQGs were developed.

In the third step of the evaluation, the accuracy of each prediction

Table 2. Sediment quality guidelines for metals in freshwater ecosystems that reflect TECs (*i.e.*, below which harmful effects are unlikely to be observed)

Substance	Threshold Effect Concentrations TEL	LEL	MET	ERL	TEL-HA28	SQAL	Consensus-Based TEC
Metals (in mg/kg DW)							
Arsenic	5.9	6	7	33	11	NG	9.79
Cadmium	0.596	0.6	0.9	5	0.58	NG	0.99
Chromium	37.3	26	55	80	36	NG	43.4
Copper	35.7	16	28	70	28	NG	31.6
Lead	35	31	42	35	37	NG	35.8
Mercury	0.174	0.2	0.2	0.15	NG	NG	0.18
Nickel	18	16	35	30	20	NG	22.7
Zinc	123	120	150	120	98	NG	121
Polycyclic aromatic hydrocarbons (in μg/kg DW)							
Anthracene	NG	220	NG	85	10	NG	57.2
Fluorene	NG	190	NG	35	10	540	77.4
Naphthalene	NG	NG	400	340	15	470	176
Phenanthrene	41.9	560	400	225	19	1,800	204
Benz[a]anthracene	31.7	320	400	230	16	NG	108
Benzo(a)pyrene	31.9	370	500	400	32	NG	150
Chrysene	57.1	340	600	400	27	NG	166
Dibenz[a,h]anthracene	NG	60	NG	60	10	NG	33.0
Fluoranthene	111	750	600	600	31	6,200	423
Pyrene	53	490	700	350	44	NG	195
Total PAHs	NG	4,000	NG	4,000	260	NG	1,610
Polychlorinated biphenyls (in μg/kg DW)							
Total PCBs	34.1	70	200	50	32	NG	59.8
Organochlorine pesticides (in μg/kg DW)							
Chlordane	4.5	7	7	0.5	NG	NG	3.24
Dieldrin	2.85	2	2	0.02	NG	110	1.90
Sum DDD	3.54	8	10	2	NG	NG	4.88
Sum DDE	1.42	5	7	2	NG	NG	3.16
Sum DDT	NG	8	9	1	NG	NG	4.16
Total DDTs	7	7	NG	3	NG	NG	5.28
Endrin	2.67	3	8	0.02	NG	42	2.22
Heptachlor epoxide	0.6	5	5	NG	NG	NG	2.47
Lindane (gamma-BHC)	0.94	3	3	NG	NG	3.7	2.37

TEL = Threshold effect level; dry weight (Smith *et al.* 1996)
LEL = Lowest effect level, dry weight (Persaud *et al.* 1993)
MET = Minimal effect threshold; dry weight (EC and MENVIQ 1992)
ERL = Effect range low; dry weight (Long and Morgan 1991)
TEL-HA28 = Threshold effect level for Hyalella azteca; 28 day test; dry weight (US EPA 1996a)
SQAL = Sediment quality advisory levels; dry weight at 1% OC (US EPA 1997a)
NG = No guideline

was evaluated by determining if the sediment sample actually was toxic to one or more aquatic organisms, as indicated by the results of various sediment toxicity tests (Ingersoll and MacDonald 1999). The following responses of aquatic organisms to contaminant challenges (*i.e.*, toxicity test endpoints) were used as indicators of toxicity in this assessment (*i.e.*, sediment samples were designated as toxic if one or more of the following endpoints were significantly different from the responses observed in reference or control sediments), including amphipod (*Hyalella azteca*) survival, growth, or reproduction; mayfly (*Hexagenia limbata*) survival or growth; midge (*Chironomus tentans* or *Chironomus riparius*) survival or growth; midge deformities; oligochaete (*Lumbriculus variegatus*) survival; daphnid (*Ceriodaphnia dubia*) survival; and bacterial (*Photobacterium phosphoreum*) luminescence (*i.e.*, Microtox). In contrast, sediment samples were designated as nontoxic if they did not cause a significant response in at least one of these test endpoints. In this study, predictive ability was calculated as the ratio of the number of samples that were correctly classified as toxic or nontoxic to the total number of samples that were predicted to be toxic or nontoxic using the various SQGs (predictive ability was expressed as a percentage).

The criteria for evaluating the reliability of the consensus-based PECs were adapted from Long *et al.* (1998). These criteria are intended to reflect the narrative intent of each type of SQG (*i.e.*, sediment toxicity should be observed only rarely below the TEC and should be frequently observed above the PEC). Specifically, the individual TECs were considered to provide a reliable basis for assessing the quality of freshwater sediments if more than 75% of the sediment samples were correctly predicted to be not toxic. Similarly, the individual PEC for each substance was considered to be reliable if greater than 75% of the sediment samples were correctly predicted to toxic using the PEC. Therefore, the target levels of both false positives (*i.e.*, samples incorrectly classified as toxic) and false negatives (*i.e.*, samples incorrectly classified as not toxic) was 25% using the TEC and PEC. To assure that the results of the predictive ability evaluation were

Table 3. Sediment quality guidelines for metals in freshwater ecosystems that reflect PECs (*i.e.*, above which harmful effects are likely to be observed)

	Probable Effect Concentrations					
Substance	PEL	SEL	TET	ERM	PEL-HA28	Consensus-Based PEC
Metals (in mg/kg DW)						
Arsenic	17	33	17	85	48	33.0
Cadmium	3.53	10	3	9	3.2	4.98
Chromium	90	110	100	145	120	111
Copper	197	110	86	390	100	149
Lead	91.3	250	170	110	82	128
Mercury	0.486	2	1	1.3	NG	1.06
Nickel	36	75	61	50	33	48.6
Zinc	315	820	540	270	540	459
Polycyclic aromatic hydrocarbons (in μg/kg DW)						
Anthracene	NG	3,700	NG	960	170	845
Fluorene	NG	1,600	NG	640	150	536
Naphthalene	NG	NG	600	2,100	140	561
Phenanthrene	515	9,500	800	1,380	410	1,170
Benz[a]anthracene	385	14,800	500	1,600	280	1,050
Benzo(a)pyrene	782	14,400	700	2,500	320	1,450
Chrysene	862	4,600	800	2,800	410	1,290
Fluoranthene	2,355	10,200	2,000	3,600	320	2,230
Pyrene	875	8,500	1,000	2,200	490	1,520
Total PAHs	NG	100,000	NG	35,000	3,400	22,800
Polychlorinated biphenyls (in μg/kg DW)						
Total PCBs	277	5,300	1,000	400	240	676
Organochlorine pesticides (in μg/kg DW)						
Chlordane	8.9	60	30	6	NG	17.6
Dieldrin	6.67	910	300	8	NG	61.8
Sum DDD	8.51	60	60	20	NG	28.0
Sum DDE	6.75	190	50	15	NG	31.3
Sum DDT	NG	710	50	7	NG	62.9
Total DDTs	4,450	120	NG	350	NG	572
Endrin	62.4	1,300	500	45	NG	207
Heptachlor Epoxide	2.74	50	30	NG	NG	16.0
Lindane (gamma-BHC)	1.38	10	9	NG	NG	4.99

PEL = Probable effect level; dry weight (Smith *et al.* 1996)
SEL = Severe effect level, dry weight (Persaud *et al.* 1993)
TET = Toxic effect threshold; dry weight (EC and MENVIQ 1992)
ERM = Effect range median; dry weight (Long and Morgan 1991)
PEL-HA28 = Probable effect level for *Hyalella azteca*; 28-day test; dry weight (US EPA 1996a)
NG = No guideline

not unduly influenced by the number of sediment samples available to conduct the evaluation of predictive ability, the various SQGs were considered to be reliable only if a minimum of 20 samples were included in the predictive ability evaluation (CCME 1995).

The initial evaluation of predictive ability was focused on determining the ability of each SQG when applied alone to classify samples correctly as toxic or nontoxic. Because field-collected sediments typically contain complex mixtures of contaminants, the predictability of these sediment quality assessment tools is likely to increase when the SQGs are used together to classify these sediments. For this reason, a second evaluation of the predictive ability of the SQGs was conducted to determine the incidence of effects above and below various mean PEC quotients (*i.e.*, 0.1, 0.5, 1.0, and 1.5). In this evaluation, mean PEC quotients were calculated using the methods of Long *et al.* (1998; *i.e.*, for each sediment sample, the average of the ratios of the concentration of each contaminant to its corresponding PEC was calculated for each sample), with only the PECs that were found to be reliable used in these calculations. The PEC for total PAHs (*i.e.*, instead of the PECs for the individual PAHs) was used in the calculation to avoid double counting of the PAH concentration data.

Results and Discussion

Derivation of Consensus-Based SQGs

A variety of approaches have been developed to support the derivation of numerical SQGs for the protection of sediment-dwelling organisms in the United States and Canada. MacDonald (1994), Ingersoll and MacDonald (1999), and MacDonald *et al.* (2000) provided reviews of the various approaches to SQG development, including descriptions of the derivation methods, the advantages and limitations of the resultant SQGs, and their recommended uses. This information, along with the supporting documentation that was obtained with the published SQGs, was used to evaluate the relevance of the various SQGs in this investigation.

Subsequently, the narrative descriptions of the various SQGs were used to classify the SQGs into appropriate categories (*i.e.*, TECs or PECs; Table 1). The results of this classification process indicated that six sets of SQGs were appropriate for deriving consensus-based TECs for the contaminants of concern in freshwater sediments, including: (1) TELs (Smith *et al.* 1996); (2) LELs (Persaud *et al.* 1993); (3) METs (EC and MENVIQ 1992); (4) ERLs (Long and Morgan 1991); (5) TELs for *H. azteca* in 28-day toxicity tests (US EPA 1996a; Ingersoll *et al.* 1996); and (6) SQALs (US EPA 1997a).

Several other SQGs were also considered for deriving consensus TECs, but they were not included for the following reasons. First, none of the SQGs that have been developed using data on the effects on sediment-associated contaminants in marine sediments only were used to derive TECs. However, the ERLs that were derived using both freshwater and marine data were included (*i.e.*, Long and Morgan 1991). Second, the ERLs that were developed by the US EPA (1996a) were not utilized because they were developed from the same data that were used to derive the TELs (*i.e.*, from several areas of concern in the Great Lakes). In addition, simultaneously extracted metals–acid volatile sulfide (SEM-AVS)–based SQGs were not used because they could not be applied without simultaneous measurements of SEM and AVS concentrations (Di Toro *et al.* 1990). None of the SQGs that were derived using the sediment background approach were used because they were not effects-based. Finally, no bioaccumulation-based SQGs were used to calculate the consensus-based TECs. The published SQGs that corresponded to TECs for metals, PAHs, PCBs, and organochlorine pesticides are presented in Table 2.

Based on the results of the initial evaluation, five sets of SQGs were determined to be appropriate for calculating consensus-based PECs for the contaminants of concern in freshwater sediments, including: (1) probable effect levels (PELs; Smith *et al.* 1996); (2) severe effect levels (SELs; (Persaud *et al.* 1993); (3) toxic effect thresholds (TETs; EC and MENVIQ 1992); (4) effect range median values (ERMs; Long and Morgan 1991); and (5) PELs for *H. azteca* in 28-day toxicity tests (US EPA 1996a; Ingersoll *et al.* 1996).

While several other SQGs were considered for deriving the consensus-based PECs, they were not included for the following reasons. To maximize the applicability of the resultant guidelines to freshwater systems, none of the SQGs that were developed for assessing the quality of marine sediments were used to derive the freshwater PECs. As was the case for the TECs, the ERMs that were derived using both freshwater and marine data (*i.e.*, Long and Morgan 1991) were included, however. The ERMs that were derived using data from various areas of concern in the Great Lakes (*i.e.*, US EPA 1996a) were not included to avoid duplicate representation of these data in the consensus-based PECs. In addition, none of the SEM-AVS–based SQGs were not used in this evaluation. Furthermore, none of the AET or related values (*e.g.*, NECs from Ingersoll *et al.* 1996; PAETs from Cubbage *et al.* 1997) were used because they were not considered to represent toxicity thresholds (rather, they represent contaminant concentrations above which harmful biological effects always occur). The published SQGs that corresponded to PECs for metals, PAHs, PCBs, and organochlorine pesticides are presented in Table 3.

For each substance, consensus-based TECs or PECs were derived if three or more acceptable SQGs were available. The consensus-based TECs or PECs were determined by calculating the geometric mean of the published SQGs and rounding to three significant digits. Application of these procedures facilitated the derivation of numerical SQGs for a total of 28 chemical substances, including 8 trace metals, 10 individual PAHs and PAH classes, total PCBs, and 9 organochlorine pesticides and degradation products. The consensus-based SQGs that were derived for the contaminants of concern in freshwater ecosystems are presented in Tables 2 and 3.

Predictive Ability of the Consensus-Based SQGs

Matching sediment chemistry and toxicity data from various locations in the United States were used to evaluate the predictive ability of the consensus-based SQGs in freshwater sediments. Within this independent data set, the overall incidence of toxicity was about 50% (*i.e.*, 172 of the 347 samples evaluated in these studies were identified as being toxic to one or more sediment-dwelling organisms). Therefore, 50% of the samples with contaminant concentrations below the TEC, between the TEC and the PEC, and above PECs would be predicted to be toxic if sediment toxicity was unrelated to sediment chemistry (*i.e.*, based on random chance alone).

The consensus-based TECs are intended to identify the concentrations of sediment-associated contaminants below which adverse effects on sediment-dwelling organisms are not expected to occur. Sufficient data were available to evaluate the predictive ability of all 28 consensus-based TECs. Based on the results of this assessment, the incidence of sediment toxicity was generally low at contaminant concentrations below the TECs (Table 4). Except for mercury, the predictive ability of the TECs for the trace metals ranged from 72% for chromium to 82% for copper, lead, and zinc. The predictive ability of the TECs for PAHs was similar to that for the trace metals, ranging from 71% to 83%. Among the organochlorine pesticides, the predictive ability of the TECs was highest for chlordane (85%) and lowest for endrin (71%). At 89%, the predictive ability of the TEC for total PCBs was the highest observed among the 28 substances for which SQGs were derived. Overall, the TECs for 21 substances, including four trace metals, eight individual PAHs, total PAHs, total PCBs, and seven organochlorine pesticides, were found to predict accurately the absence of toxicity in freshwater sediments (*i.e.*, predictive ability $\geq$75%; $\geq$20 samples below the TEC; Table 4). Therefore, the consensus-based TECs generally provide an accurate basis for predicting the absence of toxicity to sediment-dwelling organisms in freshwater sediments.

In contrast to the TECs, the consensus-based PECs are intended to define the concentrations of sediment-associated contaminants above which adverse effects on sediment-dwelling organisms are likely to be observed. Sufficient data were available to evaluate the PECs for 17 chemical substances, including 7 trace metals, 6 individual PAHs, total PAHs, total PCBs, and 2 organochlorine pesticides (*i.e.*, $\geq$20 samples predicted to be toxic). The results of the evaluation of predictive ability demonstrate that the PECs for 16 of the 17 substances meet the criteria for predictive ability that

Table 4. Predictive ability of the consensus-based TECs in freshwater sediments

Substance	Number of Samples Evaluated	Number of Samples Predicted to Be Not Toxic	Number of Samples Observed to Be Not Toxic	Percentage of Samples Correctly Predicted to Be Not Toxic
Metals				
Arsenic	150	58	43	74.1
Cadmium	347	102	82	80.4
Chromium	347	132	95	72.0
Copper	347	158	130	82.3
Lead	347	152	124	81.6
Mercury	79	35	12	34.3
Nickel	347	184	133	72.3
Zinc	347	163	133	81.6
Polycyclic aromatic hydrocarbons				
Anthracene	129	75	62	82.7
Fluorene	129	93	66	71.0
Naphthalene	139	85	64	75.3
Phenanthrene	139	79	65	82.3
Benz(a)anthracene	139	76	63	82.9
Benzo(a)pyrene	139	81	66	81.5
Chrysene	139	80	64	80.0
Dibenz(a,h)anthracene	98	77	56	72.7
Fluoranthene	139	96	72	75.0
Pyrene	139	78	62	79.5
Total PAHs	167	81	66	81.5
Polychlorinated biphenyls				
Total PCBs	120	27	24	88.9
Organochlorine pesticides				
Chlordane	193	101	86	85.1
Dieldrin	180	109	91	83.5
Sum DDD	168	101	81	80.2
Sum DDE	180	105	86	81.9
Sum DDT	96	100	77	77.0
Total DDT	110	92	76	82.6
Endrin	170	126	89	70.6
Heptachlor epoxide	138	90	74	82.2
Lindane	180	121	87	71.9

were established in this study (Table 5). Among the seven individual trace metals, the predictive ability of the PECs ranged from 77% for arsenic to 94% for cadmium. The PECs for six individual PAHs and total PAHs were also demonstrated to be reliable, with predictive abilities ranging from 92% to 100%. The predictive ability of the PEC for total PCBs was 82%. While the PEC for Sum DDE was also found to be an accurate predictor of sediment toxicity (*i.e.*, predictive ability of 97%), the predictive ability of the PEC for chlordane was somewhat lower (*i.e.*, 73%). Therefore, the consensus-based PECs for arsenic, cadmium, chromium, copper, lead, nickel, zinc, naphthalene, phenanthrene, benz[a]anthracene, benzo(a)pyrene, chrysene, pyrene, total PAHs, total PCBs, and sum DDE provide an accurate basis for predicting toxicity in freshwater sediments from numerous locations in North America (*i.e.*, predictive ability of ≥75%; Table 5). Insufficient data were available (*i.e.*, fewer than 20 samples predicted to be toxic) to evaluate the PECs for mercury, anthracene, fluorene, fluoranthene, dieldrin, sum DDD, sum DDT, total DDT, endrin, heptachlor epoxide, and lindane (Table 5).

The two types of SQGs define three ranges of concentrations for each chemical substance. It is possible to assess the degree of concordance that exists between chemical concentrations and the incidence of sediment toxicity (Table 6; MacDonald *et al.* 1996) by determining the ratio of toxic samples to the total number of samples within each of these three ranges of concentrations for each substance. The results of this evaluation demonstrate that, for most chemical substances (*i.e.*, 20 of 28), there is a consistent and marked increase in the incidence of toxicity to sediment-dwelling organisms with increasing chemical concentrations. For certain substances, such as naphthalene, mercury, chlordane, dieldrin, and sum DDD, a lower PEC may have produced greater concordance between sediment chemistry and the incidence of effects. Insufficient data were available to evaluate the degree of concordance for several substances, such as endrin, heptachlor epoxide, and lindane. The positive correlation between contaminant concentrations and sediment toxicity that was observed increases the degree of confidence that can be placed in the SQGs for most of the substances.

While the SQGs for the individual chemical substances provide reliable tools for assessing sediment quality conditions, predictive ability should be enhanced when used together in assessments of sediment quality. In addition, it would be helpful to consider the magnitude of the exceedances of the SQGs in such assessments. Long *et al.* (1998) developed a procedure for evaluating the biological significance of contaminant mixtures through the application of mean PEC quotients. A three-

Table 5. Predictive ability of the consensus-based PECs in freshwater sediments

Substance	Number of Samples Evaluated	Number of Samples Predicted to Be Toxic	Number of Samples Observed to Be Toxic	Percentage of Samples Correctly Predicted to Be Toxic
Metals				
Arsenic	150	26	20	76.9
Cadmium	347	126	118	93.7
Chromium	347	109	100	91.7
Copper	347	110	101	91.8
Lead	347	125	112	89.6
Mercury	79	4	4	100
Nickel	347	96	87	90.6
Zinc	347	120	108	90.0
Polycyclic aromatic hydrocarbons				
Anthracene	129	13	13	100
Fluorene	129	13	13	100
Naphthalene	139	26	24	92.3
Phenanthrene	139	25	25	100
Benz(a)anthracene	139	20	20	100
Benzo(a)pyrene	139	24	24	100
Chrysene	139	24	23	95.8
Fluoranthene	139	15	15	100
Pyrene	139	28	27	96.4
Total PAHs	167	20	20	100
Polychlorinated biphenyls				
Total PCBs	120	51	42	82.3
Organochlorine pesticides				
Chlordane	193	37	27	73.0
Dieldrin	180	10	10	100
Sum DDD	168	6	5	83.3
Sum DDE	180	30	29	96.7
Sum DDT	96	12	11	91.7
Total DDT	110	10	10	100
Endrin	170	0	0	NA
Heptachlor epoxide	138	8	3	37.5
Lindane	180	17	14	82.4

NA = Not applicable

step process is used in the present study to calculate mean PEC quotients. In the first step, the concentration of each substance in each sediment sample is divided by its respective consensus-based PEC. PEC quotients are calculated only for those substances for which reliable PECs were available. Subsequently, the sum of the PEC quotients was calculated for each sediment sample by adding the PEC quotients that were determined for each substance; however, only the PECs that were demonstrated to be reliable were used in the calculation. The summed PEC quotients were then normalized to the number of PEC quotients that are calculated for each sediment sample (*i.e.*, to calculate the mean PEC quotient for each sample; Canfield *et al.* 1998; Long *et al.* 1998; Kemble *et al.* 1999). This normalization step is conducted to provide comparable indices of contamination among samples for which different numbers of chemical substances were analyzed.

The predictive ability of the PEC quotients, as calculated using the consensus-based SQGs, was also evaluated using data that were assembled to support the predictive ability assessment for the individual PECs. In this evaluation, sediment samples were predicted to be not toxic if mean PEC quotients were <0.1 or <0.5. In contrast, sediment samples were predicted to be toxic when mean PEC quotients exceeded 0.5, 1.0, or 1.5. The results of this evaluation indicated that the consensus-based SQGs, when used, together provide an accurate basis for predicting the absence of sediment toxicity (Table 7; Figure 1). Sixty-one sediment samples had mean PEC quotients of <0.1; six of these samples were toxic to sediment-dwelling organisms (predictive ability = 90%). Of the 174 samples with mean PEC quotients of < 0.5, only 30 were found to be toxic to sediment-dwelling organisms (predictive ability = 83%; Table 7).

The consensus-based SQGs also provided an accurate basis for predicting sediment toxicity in sediments that contained mixtures of contaminants. Of the 173 sediment samples with mean PEC quotients of > 0.5 (calculated using the PECs for seven trace metals, the PEC for total PAHs [rather than the PECs for individual PAHs], the PEC for PCBs, and the PEC for sum DDE), 147 (85%) were toxic to sediment-dwelling organisms (Table 7; Figure 1). Similarly, 92% of the sediment samples (132 of 143) with mean PEC quotients of > 1.0 were toxic to one or more species of aquatic organisms. Likewise, 94% of the sediment samples (118 of 125) with mean PEC quotients of greater than 1.5 were found to be toxic, based on the results of various freshwater toxicity tests. Therefore, it is apparent that a mean PEC quotient of 0.5 represents a useful

Table 6. Incidence of toxicity within ranges of contaminant concentrations defined by the SQGs

Substance	Number of Samples Evaluated	Incidence of Toxicity (%, number of samples in parentheses)		
		≤TEC	TEC-PEC	> PEC
Metals				
Arsenic	150	25.9% (15 of 58)	57.6% (38 of 66)	76.9% (20 of 26)
Cadmium	347	19.6% (20 of 102)	44.6% (29 of 65)	93.7% (118 of 126)
Chromium	347	28% (37 of 132)	64.4% (38 of 59)	91.7% (100 of 109)
Copper	347	17.7% (28 of 158)	64.0% (48 of 75)	91.8% (101 of 110)
Lead	347	18.4% (28 of 152)	53.6% (37 of 69)	89.6% (112 of 125)
Mercury	79	65.7% (23 of 35)	70.0% (28 of 40)	100% (4 of 4)
Nickel	347	27.7% (51 of 184)	62.7% (32 of 51)	90.6% (87 of 96)
Zinc	347	18.4% (30 of 163)	60.9% (39 of 64)	90.0% (108 of 120)
Polycyclic aromatic hydrocarbons				
Anthracene	129	17.3% (13 of 75)	92.9% (26 of 28)	100% (13 of 13)
Fluorene	129	29% (27 of 93)	85.7% (12 of 14)	100% (13 of 13)
Naphthalene	139	24.7% (21 of 85)	94.1% (16 of 17)	92.3% (24 of 26)
Phenanthrene	139	17.7% (14 of 79)	88.2% (30 of 34)	100% (25 of 25)
Benz(a)anthracene	139	17.1% (13 of 76)	70% (14 of 20)	100% (20 of 20)
Benzo(a)pyrene	139	18.5% (15 of 81)	75.7% (28 of 37)	100% (24 of 24)
Chrysene	139	20% (16 of 80)	68.1% (32 of 47)	95.8% (23 of 24)
Fluoranthene	139	25% (24 of 96)	82.5% (33 of 40)	100% (15 of 15)
Pyrene	139	20.5% (16 of 78)	63.0% (29 of 46)	96.4% (27 of 28)
Total PAHs	167	18.5% (15 of 81)	65.1% (43 of 66)	100% (20 of 20)
Polychlorinated biphenyls				
Total PCBs	120	11.1% (3 of 27)	31.0% (9 of 29)	82.3% (42 of 51)
Organochlorine pesticides				
Chlordane	193	14.9% (15 of 101)	75.0% (15 of 20)	73.0% (27 of 37)
Dieldrin	180	16.5% (18 of 109)	95.2% (20 of 21)	100% (10 of 10)
Sum DDD	168	19.8% (20 of 101)	33.3% (1 of 3)	83.3% (5 of 6)
Sum DDE	180	18.1% (19 of 105)	33.3% (1 of 3)	96.7% (29 of 30)
Sum DDT	96	23% (23 of 100)	0.0% (0 of 1)	91.7% (11 of 12)
Total DDT	110	17.4% (16 of 92)	100% (23 of 23)	100% (10 of 10)
Endrin	170	29.4% (37 of 126)	40.0% (4 of 10)	NA% (0 of 0)
Heptachlor epoxide	138	17.8% (16 of 90)	85.0% (17 of 20)	37.5% (3 of 8)
Lindane	180	28.1% (34 of 121)	65.9% (29 of 44)	82.4% (14 of 17)

Table 7. Predictive ability of mean PEC quotients in freshwater sediments

Mean PEC Quotient	Mean PEC Quotients Calculated with Total PAHs Predictive Ability (%)	Mean PEC Quotients Calculated with Individual PAH Predictive Abilities (%)
<0.1	90.2% (61)	90.2% (61)
<0.5	82.8% (174)	82.9% (175)
>0.5	85% (173)	85.4% (172)
>1.0	93.3% (143)	93.4% (143)
>1.5	94.4% (125)	95% (121)

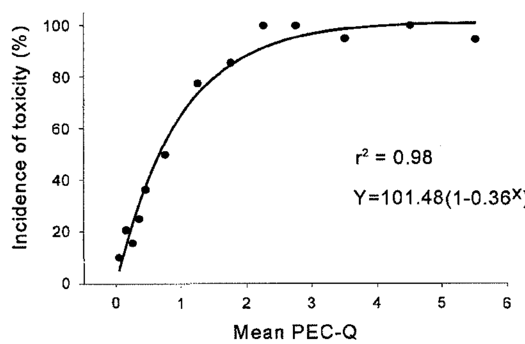

Fig. 1. Relationship between mean PEC quotient and incidence of toxicity in freshwater sediments

threshold that can be used to accurately classify sediment samples as both toxic and not toxic. The results of this evaluation were not substantially different when the PECs for the individuals PAHs (*i.e.*, instead of the PEC for total PAHs) were used to calculate the mean PEC quotients (Table 7). Kemble *et al.* (1999) reported similar results when the mean PEC quotients were evaluated using the results of only 28-day toxicity tests with *H. azteca* (n = 149, 32% of the samples were toxic).

To examine further the relationship between the degree of chemical contamination and probability of observing toxicity in freshwater sediments, the incidence of toxicity within various ranges of mean PEC quotients was calculated (*e.g.*, < 0.1, 0.1–0.2, 0.2–0.3). Next, these data were plotted against the midpoint of each range of mean PEC quotients (Figure 1). Subsequent curve-fitting indicated that the mean PEC-quotient is highly correlated with incidence of toxicity ($r^2 = 0.98$), with the relationship being an exponential function. The resultant equation can be used to estimate the probability of observing sediment toxicity at any mean PEC quotient.

Although it is important to be able to predict accurately the presence and absence of toxicity in field-collected sediments, it is also helpful to be able to identify the factors that are causing or substantially contributing to sediment toxicity. Such information enables environmental managers to focus limited resources on the highest-priority sediment quality issues and concerns. In this context, it has been suggested that the results of spiked sediment toxicity tests provide a basis for identifying the concentrations of sediment-associated contaminants that cause sediment toxicity (Swartz *et al.* 1988; Ingersoll *et al.* 1997). Unfortunately, there is limited relevant data available that assesses effects of spiked sediment in freshwater systems. For example, the available data from spiked sediment toxicity tests is limited to just a few of the chemical substances for which reliable PECs are available, primarily copper and fluoranthene. Additionally, differences in spiking procedures, equilibration time, and lighting conditions during exposures confound the interpretation of the results of sediment spiking studies, especially for PAHs (ASTM 1999). Moreover, many sediment spiking studies were conducted to evaluate bioaccumulation using relatively insensitive test organisms (*e.g., Diporeia* and *Lumbriculus*) or in sediments containing mixtures of chemical substances (Landrum *et al.* 1989, 1991).

In spite of the limitations associated with the available dose-response data, the consensus-based PECs for copper and fluoranthene were compared to the results of spiked sediment toxicity tests. Suedel (1995) conducted a series of sediment spiking studies with copper and reported 48-h to 14-day LC_{50} for four freshwater species, including the waterfleas *Ceriodaphnia dubia* (32–129 mg/kg DW) and *Daphnia magna* (37–170 mg/kg DW), the amphipod *H. azteca* (247–424 mg/kg DW), and the midge *C. tentans* (1,026–4,522 mg/kg DW). An earlier study reported 10-day LC_{50}s of copper for *H. azteca* (1,078 mg/kg) and *C. tentans* (857 mg/kg), with somewhat higher effect concentrations observed in different sediment types (Cairns *et al.* 1984). The PEC for copper (149 mg/kg DW) is higher than or comparable to (*i.e.*, within a factor of three; MacDonald *et al.* 1996; Smith *et al.* 1996) the median lethal concentrations for several of these species. For fluoranthene, Suedel and Rodgers (1993) reported 10-day EC_{50}s of 4.2–15.0 mg/kg, 2.3–7.4 mg/kg, and 3.0–8.7 mg/kg for *D. magna, H. azteca*, and *C. tentans*, respectively. The lower of the values reported for each species are comparable to the PEC for fluoranthene that was derived in this study (*i.e.*, 2.23 mg/kg). Much higher toxicity thresholds have been reported in other studies (*e.g.*, Kane Driscoll *et al.* 1997; Kane Driscoll and Landrum 1997), but it is likely that these results were influenced by the lighting conditions under which the tests were conducted. Although this evaluation was made with limited data, the results suggest that the consensus-based SQGs are comparable to the acute toxicity thresholds that have been obtained from spiking studies.

A second approach—to identify concentrations of sediment-associated contaminants that cause or contribute to toxicity—was to compare our consensus-based PECs to equilibrium partitioning values (Swartz 1999; MacDonald *et al.* 1999). The equilibrium partitioning (EqP) approach provides a theoretical basis for deriving sediment quality guidelines for the protection of freshwater organisms (Di Toro *et al.* 1991; Zarba 1992). Using this approach, the US EPA (1997a) developed SQGs that are intended to represent chronic toxicity thresholds for various sediment-associated contaminants, primarily nonionic organic substances. The concentrations of these contaminants are considered to be sufficient to cause or substantially contribute to sediment toxicity when they exceed the EqP-based SQGs (Berry *et al.* 1996). To evaluate the extent to which the consensus-based SQGs are causally based, the PECs were compared to the chronic toxicity thresholds that have been developed previously using the EqP approach (see Table 2). The results of this evaluation indicate that the consensus-based PECs are generally comparable to the EqP-based SQGs (*i.e.*, within a factor of three; MacDonald *et al.* 1996; Smith *et al.* 1996). Therefore, the consensus-based PECs also define concentrations of sediment-associated contaminants that are sufficient to cause or substantially contribute to sediment toxicity.

Summary

Consensus-based SQGs were derived for 28 common chemicals of concern in freshwater sediments. For each chemical substance, two consensus-based SQGs were derived from the published SQGs. These SQGs reflect the toxicity of sediment-associated contaminants when they occur in mixtures with other contaminants. Therefore, these consensus-based SQGs are likely to be directly relevant for assessing freshwater sediments that are influenced by multiple sources of contaminants. The results of the evaluations of predictive ability demonstrate that the TECs and PECs for most of these chemicals, as well as the PEC quotients, provide a reliable basis for classifying sediments as not toxic and toxic. In addition, positive correlations between sediment chemistry and sediment toxicity indicate that many of these sediment-associated contaminants are associated with the effects that were observed in field-collected sediments. Furthermore, the level of agreement between the available dose-response data, the EqP-based SQGs, and the consensus-based SQGs indicates that sediment-associated contaminants are likely to cause or substantially contribute to, as opposed to simply be associated with, sediment toxicity at concentrations above the PECs.

Overall, the results of the various evaluations demonstrate that the consensus-based SQGs provide a unifying synthesis of the existing SQGs, reflect causal rather than correlative effects, and account for the effects of contaminant mixtures (Swartz 1999). As such, the SQGs can be used to identify hot spots with respect to sediment contamination, determine the potential for and spatial extent of injury to sediment-dwelling organisms, evaluate the need for sediment remediation, and support the development of monitoring programs to further assess the extent of contamination and the effects of contaminated sediments on sediment-dwelling organisms. These applications are strengthened when the SQGs are used in combination with other sediment quality assessment tools (*i.e.*, sediment toxicity tests, bioaccumulation assessments, benthic invertebrate community assessments; Ingersoll *et al.* 1997). In these applications, the TECs should be used to identify sediments that are unlikely to be adversely affected by sediment-associated contaminants. In contrast, the PECs should be used to identify sediments that are likely to be toxic to sediment-dwelling organisms. The PEC quotients should be used to assess sediment that contain complex mixtures of chemical contaminants.

The consensus-based SQGs described in this paper do not consider the potential for bioaccumulation in aquatic organisms nor the associated hazards to the species that consume aquatic organisms (*i.e.*, wildlife and humans). Therefore, it is important to use the consensus-based SQGs in conjunction with other tools, such as bioaccumulation-based SQGs, bioaccumulation tests, and tissue residue guidelines, to evaluate more fully the potential effects of sediment-associated contaminants in the environment. Future investigations should focus of evaluating the predictive ability of these sediment assessment tools on a species- and endpoint-specific basis for various geographic areas.

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References

Adams WJ, Kimerle RA, Barnett JW Jr (1992) Sediment quality and aquatic life assessment. Environ Sci Technol 26:1863–1876

ASTM (American Society for Testing and Materials) (1999) Standard guide for determination of bioaccumulation of sediment-associated contaminants in benthic invertebrates. E1688-97a, ASTM 1999 Annual Book of Standards, vol. 11.05, Conghohocken, PA

Barrick R, Becker S, Pastorok R, Brown L, Beller H (1988) Sediment quality values refinement: 1988 update and evaluation of Puget Sound AET. Prepared by PTI Environmental Services for Environmental Protection Agency, Bellevue, WA

Berry WJ, Hansen DJ, Mahoney JD, Robson DL, Di Toro DM, Shipley DP, Rogers B, Corbin JM, Boothman WS (1996) Predicting the toxicity of metal-spiked laboratory sediments using acid-volatile sulfide and interstitial water normalizations. Environ Toxicol Chem 15:2067–2079

Bolton SH, Breteler RJ, Vigon BW, Scanlon JA, Clark SL (1985) National perspective on sediment quality. Prepared for the US Environmental Protection Agency, Washington, DC, 194 pp

Burton A (1994) Sediment sampling and analysis plan—West Branch Grand Calumet River: 1993 sediment toxicity test data summaries. Prepared for Environmental Science Division, US Environmental Protection Agency, Region V, Chicago, IL

Cairns MA, Nebeker AV, Gakstater JH, Griffis WL (1984) Toxicity of copper-spiked sediments to freshwater invertebrates. Environ Toxicol Chem 3:435–445

Call DJ, Balcer MD, Brooke LT, Lozano SJ, Vaishnav DD (1991) Sediment quality evaluation in the Lower Fox River and Southern Green Bay of Lake Michigan. Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Superior, WI, 270 pp

Canfield TJ, Brunson EL, Dwyer FJ, Ingersoll CG, Kemble NE (1998) Assessing sediments from the upper Mississippi River navigational pools using benthic invertebrates and the sediment quality triad. Arch Environ Contam Toxicol 35:202–212

CCME (Canadian Council of Ministers of the Environment) (1995) Protocol for the derivation of Canadian sediment quality guidelines for the protection of aquatic life. Prepared by the Technical Secretariat of the CCME Task Group on Water Quality Guidelines, Ottawa

Cubbage J, Batts D, Briedenbach S (1997) Creation and analysis of freshwater sediment quality values in Washington State. Environmental Investigations and Laboratory Services Program, Washington Department of Ecology, Olympia, WA

Dickson KL, Waller WT, Kennedy JH, Arnold WR, Desmond WP, Dyer SD, Hall JF, Knight JT, Malas D, Martinez ML, Matzner SL (1989) A water quality and ecological survey on the Trinity River, vol. 1 and 2. Institute of Applied Sciences, University of North Texas, University of Texas, Dallas, TX

Di Toro DM, Mahony JD, Hansen DJ, Scott KJ, Hicks MB, Mayr SM, Redmond MS (1990) Toxicity of cadmium in sediments: the role of acid volatile sulfide. Environ Toxicol Chem 9:1487–1502

Di Toro DM, Zarba CS, Hansen DJ, Berry WJ, Swartz RC, Cowan CE, Pavlou SP, Allen HE, Thomas NA, Paquin PR (1991) Technical basis for establishing sediment quality criteria for non-ionic organic chemicals using equilibrium partitioning. Environ Toxicol Chem 10:1541–1583

Dorkin J (1994) Sediment sampling and analysis plan—West Branch Grand Calumet River: 1993 sediment chemistry data summaries. Environmental Science Division, US Environmental Protection Agency, Region V, Chicago, IL

EC, MENVIQ (Environment Canada and Ministere de l'Envionnement du Quebec) (1992) Interim criteria for quality assessment of St. Lawrence River sediment. Environment Canada, Ottawa

Giesy JP, Hoke RA, Zabik MJ (1993) Sediment toxicity assessment in the Grand Calumet River system. Department of Fisheries and Wildlife, Michigan State University, East Lansing, MI

Hoke RA, Giesy JP, Zabik M, Unger M (1993) Toxicity of sediments and sediment pore waters from the Grand Calumet River—Indiana Harbor, Indiana, area of concern. Ecotoxicol Environ Safety 26: 86–112

Ingersoll CG, MacDonald DD (1999) An assessment of sediment injury in the West Branch of the Grand Calumet River, vol. 1. US Geological Survey, Columbia, MO, MacDonald Environmental Sciences Ltd., Ladysmith, British Columbia, 161 pp

Ingersoll CG, Haverland PS, Brunson EL, Canfield TJ, Dwyer FJ, Henke CE, Kemble NE, Mount DR, Fox RG (1996) Calculation and evaluation of sediment effect concentrations for the amphipod *Hyalella azteca* and the midge *Chironomus riparius*. J Great Lakes Res 22:602–623

Ingersoll CG, Dillon T, Biddinger RG (1997) Methodological uncertainty in sediment ecological risk assessment. In: Ecological risk assessments of contaminated sediment. SETAC Press, Pensacola, FL 389 pp

Johnson A, Norton D (1988) Screening survey for chemical contaminants and toxicity in sediments at five lower Columbia River ports. Environmental Investigations and Laboratory Services Program, Washington State Department of Ecology, Olympia, WA

Kane Driscoll S, Landrum PF (1997) Comparison of equilibrium partitioning and critical body residue approaches for predicting toxicity of sediment-associated fluoranthene to freshwater amphipods. Environ Toxicol Chem 16:2179–2186

Kane Driscoll S, Harkey GA, Landrum PF (1997) Accumulation and toxicokinetics of fluoranthene in sediment bioassays with freshwater amphipods. Environ Toxicol Chem 16(4):742–753

Kemble NE, Dwyer FJ, Hardesty DK, Ingersoll CG, Johnson BT,

MacDonald DD (1999) Evaluation of the toxicity and bioaccumulation of contaminants in sediment samples from Waukegan Harbor, Illinois. US Environmental Protection Agency, Chicago, IL
Landrum PF, Faust WR, Eadie BJ (1989) Bioavailability and toxicity of a mixture of sediment-associated chlorinated hydrocarbons to the amphipod, *Pontoporeia hoyi*. In: Cowgill UM, Williams LR (eds) Aquatic toxicology and hazard assessment, 12th vol. STP 1027, American Society for Testing and Materials, Philadelphia, PA, pp 315–329
Landrum PF, Eadie BJ, Faust WR (1991) Toxicokenetics and toxicity of a mixture of sediment-associated polycyclic aromatic hydrocarbons to the amphipod, *Diporeia* sp. Environ Toxicol Chem 10:35–46
Long ER, Morgan LG (1991) The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52, National Oceanic and Atmospheric Administration, Seattle, WA, 175 pp + appendices
Long ER, MacDonald DD (1998) Recommended uses of empirically-derived sediment quality guidelines for marine and estuarine ecosystems. Human Ecolog Risk Assess 4:1019–1039
Long ER, MacDonald DD, Smith SL, Calder FD (1995) Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environ Manage 19: 81–97
Long ER, Field LJ, MacDonald DD (1998) Predicting toxicity in marine sediments with numerical sediment quality guidelines. Environ Toxicol Chem 17:714–727
MacDonald DD (1994) Approach to the assessment of sediment quality in Florida coastal waters. Volume 1—Development and evaluation of the sediment quality assessment guidelines. Report prepared for Florida Department of Environmental Protection, Tallahassee, FL
MacDonald DD (1997) Sediment injury in the Southern California Bight: review of the toxic effects of DDTs and PCBs in sediments. Prepared for National Oceanic and Atmospheric Administration, US Department of Commerce, Long Beach, CA
MacDonald DD, Smith SL, Wong MP, Murdoch P (1992) The development of Canadian marine environmental quality guidelines. Ecosystem Sciences and Evaluation Directorate, Environment Canada, Ottawa, 32 pp + appendix
MacDonald DD, Charlish BL, Haines ML, Brydges K (1994) Development and evaluation of an approach to the assessment of sediment quality in Florida coastal waters. Volume 3—Supporting documentation: biological effects database for sediments. Report prepared for Florida Department of Environmental Protection, Tallahassee, FL, 275 pp
MacDonald DD, Carr RS, Calder FD, Long ER, Ingersoll CG (1996) Development and evaluation of sediment quality guidelines for Florida coastal waters. Ecotoxicology 5:253–278
MacDonald DD, DiPinto LM, Field J, Ingersoll CG, Long ER, Swartz RC (2000) Development and evaluation of consensus-based sediment effect concentrations for polychlorinated biphenyls (PCBs). Environ Toxicol Chem (in press)
NYSDEC (New York State Department of Environmental Conservation) (1994) Technical guidance for screening contaminated sediments. Division of Fish and Wildlife, Division of Marine Resources, Albany, NY, 36 pp
Persaud D, Jaagumagi R, Hayton A (1993) Guidelines for the protection and management of aquatic sediment quality in Ontario. Water Resources Branch, Ontario Ministry of the Environment, Toronto, 27 pp
Schlekat C, McGee BL, Boward DM, Reinharz E, Velinsky DJ, Wade TL (1994) Biological effects associated with sediment contamination in the Potomac and Anacostia Rivers in the Washington, D.C. area. Estuaries 17:334–344
Smith SL, MacDonald DD, Keenleyside KA, Ingersoll CG, Field J (1996) A preliminary evaluation of sediment quality assessment values for freshwater ecosystems. J Great Lakes Res 22:624–638
Suedel BC (1995) Reducing uncertainty in laboratory sediment toxicity tests. API Publication no. 4632, prepared for the American Petroleum Institute, Department of Biology, University of Mississippi, University, MS
Suedel BC, Rodgers JH (1993) Bioavailability of fluoranthene in freshwater sediment toxicity tests. Environ Toxicol Chem 12:155–165
Swartz RC (1999) Consensus sediment quality guidelines for PAH mixtures. Environ Toxicol Chem 18:780–787
Swartz RC, Kemp PF, Schults DW, Lamberson JO (1988) Effects of mixtures of sediment contaminants on the marine infaunal amphipod *Rhepoxynius abronius*. Environ Toxicol Chem 7:1013–1020
US EPA (United States Environmental Protection Agency) (1992) Sediment classification methods compendium. EPA 823-R-92-006, Office of Water, Washington, DC, 222 pp
US EPA (United States Environmental Protection Agency) (1993a) Assessment of sediment in the Indiana Harbor area of concern. EPA 905-R96-009, Great Lakes National Program Office, Region V, Chicago, IL
US EPA (United States Environmental Protection Agency) (1993b) Assessment of sediment in the Saginaw River area of concern. EPA 905-R96-010, Great Lakes National Program Office, Region V, Chicago, IL
US EPA (United States Environmental Protection Agency) (1993c) Assessment of sediment in the Buffalo River area of concern. EPA 905-R96-009, Great Lakes National Program Office, Region V, Chicago, IL
US EPA (United States Environmental Protection Agency) (1996a) Calculation and evaluation of sediment effect concentrations for the amphipod *Hyalella azteca* and the midge *Chironomus riparius*. EPA 905-R96-008, Great Lakes National Program Office, Region V, Chicago, IL
US EPA (United States Environmental Protection Agency) (1996b) Assessment of sediment in the Indiana Harbor area of concern. EPA 905-R96-009, Great Lakes National Program Office, Region V, Chicago, IL
US EPA (United States Environmental Protection Agency) (1997a) The incidence and severity of sediment contamination in surface waters of the United States. Volume 1: National sediment quality survey. EPA 823-R-97-006, Office of Science and Technology, Washington, DC
US EPA (United States Environmental Protection Agency) (1997b) An assessment of sediments from the Upper Mississippi River. Final report—June, 1997. EPA 823-R-97-005, Prepared by US Department of the Interior, Columbia, MO
USFWS (United States Fish and Wildlife Service) (1993) Milltown endangerment assessment project: effects of metal-contaminated sediment, water, and diet on aquatic organisms. NTIS PB93-21592, National Fisheries Contaminant Research Center, Columbia, MO
Velinsky DJ, Wade TL, Schlekat CE, McGee BL, Presley BJ (1994) Tidal river sediments in the Washington, D.C. area. I. Distribution and sources of trace metals. Estuaries 17:305–320
Wade TL, Velinsky DJ, Reinharz E, Schlekat CE (1994) Tidal river sediments in the Washington, D.C. area. II. Distribution and sources of organic contaminants. Estuaries 17:321–333
Zarba CS (1992) Equilibrium partitioning approach. In: Sediment classification methods compendium. EPA 823-R-92-006, Office of Water, US Environmental Protection Agency, Washington, DC